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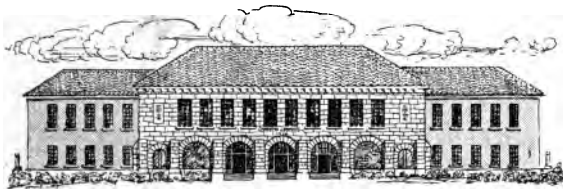
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K E Y

TO THE

NEW PRACTICAL ARITHMETIC;

WITH

ANSWERS TO EXERCISES

IN THE

NEW ELEMENTARY ARITHMETIC.

PREPARED FOR THE

MATHEMATICAL SERIES

OF

BENJAMIN GREENLEAF, A. M.

BY A PRACTICAL TEACHER.

LEACH, SHEWELL AND SANBORN,
BOSTON AND NEW YORK.

GREENLEAF'S NEW COMPREHENSIVE SERIES.

*An ENTIRELY NEW MATHEMATICAL COURSE, Analytical
and Practical, Progressive and Scientific,
fully adapted to the best methods
of modern instruction.*

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GREENLEAF'S NEW ELEMENTARY ARITHMETIC.
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GREENLEAF'S NEW ELEMENTARY ALGEBRA.
GREENLEAF'S NEW ELEMENTARY GEOMETRY.
GREENLEAF'S NEW HIGHER ALGEBRA.
GREENLEAF'S ELEMENTS OF GEOMETRY.
GREENLEAF'S ELEMENTS OF TRIGONOMETRY.

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In the Clerk's Office of the District Court of the District of Massachusetts.

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PREFACE.

IN deference to the opinion of some good teachers, the editor of the New Practical Arithmetic has been disinclined, either to make, or authorize to be made, a Key to that work.

It appears, however, that there can hardly be a mathematical book of any considerable popularity without a Key in some form. Withholding such a help in this case from the teacher and private learner, has failed of the hoped-for result. It has given occasion for the manufacture of many manuscript keys, and their free use in the school-room.

It has, also, been found that many teachers desire ready access to omitted answers, and that not a few, who are in charge of many pupils, fail of time to examine in detail numerous arithmetical operations, without a hand-book of solutions.

In view of these facts, the preparation of this book, by a practical teacher, was sanctioned.

It gives omitted answers to exercises both in the New Elementary and New Practical Arithmetics. It furnishes operations to exercises in the latter book — not full solutions or entire analyses — so that, while it may be of aid to the teacher, it can hardly be of much avail to the pupil.

Any teacher who will promptly furnish his pupils with all needed assistance, and who has the moral power to enforce precepts, need not, it is believed, fear any surreptitious use of Keys in his school.

KINGSTON, MASS., May, 1867.

KEY

TO

NEW PRACTICAL ARITHMETIC.

NOTATION.

(ART. 35, p. 16.)

| | | | |
|-----|----------|-----|--------------------|
| 4. | Ans. 125 | 12. | Ans. 100,764 |
| 5. | 796 | 13. | 100,415 |
| 6. | 89 | 14. | 36,046 |
| 7. | 997 | 15. | 1,100,100 |
| 8. | 5,062 | 16. | 151,000,000 |
| 9. | 55,500 | 18. | 16,741,223,178,000 |
| 10. | 106,000 | | |

ADDITION.

(ART. 40, pp. 20, 21.)

| | | | |
|-----|----------|-----|------------|
| 6. | Ans. 980 | 18. | Ans. 8,105 |
| 7. | 6,413 | 19. | 1,286 |
| 8. | 923 | 20. | 23,284 |
| 9. | 1,661 | 22. | 111,111 |
| 10. | 11,239 | 27. | 1,383,458 |
| 11. | 38,248 | 28. | 341,540 |
| 12. | 1,869 | 30. | 1,407,770 |
| 13. | 4,326 | 31. | 47,454 |
| 14. | 1,586 | 33. | 8,337 |
| 15. | 2,737 | | |

(PAGES 22-24.)

| | | | |
|-----|------------|-----|------------|
| 4. | Ans. 3,676 | 15. | Ans. 4,387 |
| 8. | 1,560 | 21. | 11,816 |
| 10. | 21,588 | 22. | 236 |
| 12. | 152,045 | | |

SUBTRACTION.

(ART. 45, pp. 29, 30.)

| | | | |
|-----|----------|-----|------------|
| 6. | Ans. 108 | 16. | Ans. 6,737 |
| 7. | 235 | 22. | 45,785 |
| 8. | 376 | 26. | 3,877 |
| 9. | 2,802 | 27. | 2,092 |
| 10. | 459 | 28. | 401 |
| 11. | 717 | 33. | 98,999,991 |
| 12. | 1,088 | 34. | 350,185 |
| 13. | 722 | | |

(PAGES 30, 31.)

| | | | |
|-----|---------------|-----|-----------|
| 4. | (In 1867.) 98 | 13. | 24,354 |
| 5. | 86 | 15. | 4,491 |
| 6. | 890 | 17. | 1,084,800 |
| 11. | 1,815 | | |

REVIEW EXERCISES.

(PAGE 32.)

(5.)

| | |
|-------------------|----------|
| $1,575 + 3,600 =$ | 5,175 |
| $6,000 - 5,175 =$ | 825 Ans. |

(6.)

| | |
|---------------------------|--------------------|
| $8,000 + 3,500 + 4,500 =$ | 16,000 |
| $24,000 - 16,000 =$ | 8,000 dolls., Ans. |

(7.)

$$\begin{aligned} 16,830 - 9,460 &= \\ 7,370 + 2,000 &= \end{aligned}$$

$$\begin{aligned} 7,370 \\ 9,370 \text{ dolls.} \end{aligned}$$

(8.)

$$\begin{aligned} 125 + 75 + 58 &= \\ 275 - 258 &= \end{aligned}$$

$$\begin{aligned} 258 \\ 17 \text{ dolls.} \end{aligned}$$

MULTIPLICATION.

(ART. 51, p. 38.)

| | | | |
|-----|------------|-----|--------------|
| 9. | Ans. 1,176 | 18. | Ans. 302,205 |
| 10. | 38,905 | 21. | 978,609 |
| 11. | 13,395 | 27. | 542,496 |
| 12. | 44,256 | 30. | 85,153 |
| 15. | 24,822 | 33. | 7,245 |

(37.)

$$\begin{array}{r} 75452 \\ 47 \\ \hline 528164 \\ 301808 \\ \hline 3546244 \text{ Ans.} \end{array}$$

(40.)

$$\begin{array}{r} 137 \\ 35 \\ \hline 685 \\ 411 \\ \hline 4795 \text{ Ans.} \end{array}$$

(38.)

$$\begin{array}{r} 54302 \\ 89 \\ \hline 488718 \\ 434416 \\ \hline 4832878 \text{ Ans.} \end{array}$$

(41.)

$$\begin{array}{r} 567 \\ 108 \\ \hline 4536 \\ 567 \\ \hline 61236 \text{ Ans.} \end{array}$$

(39.)

$$\begin{array}{r} 784 \\ 203 \\ \hline 2352 \\ 1568 \\ \hline 159152 \text{ Ans.} \end{array}$$

(42.)

$$\begin{array}{r} 37 \\ 25 \\ \hline 185 \\ 74 \\ \hline 925 \\ 5 \\ \hline 4625 \text{ Ans.} \end{array}$$

(PAGES 22-24.)

| | | | |
|-----|------------|-----|------------|
| 4. | Ans. 3,676 | 15. | Ans. 4,387 |
| 8. | 1,560 | 21. | 11,816 |
| 10. | 21,588 | 22. | 236 |
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SUBTRACTION.

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| 8. | 376 | 26. | 3,877 |
| 9. | 2,802 | 27. | 2,092 |
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| 11. | 717 | 33. | 98,999,991 |
| 12. | 1,088 | 34. | 350,185 |
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(PAGES 30, 31.)

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| 11. | 1,815 | | |

REVIEW EXERCISES.

(PAGE 32.)

(5.)

| | |
|-------------------|----------|
| $1,575 + 3,600 =$ | 5,175 |
| $6,000 - 5,175 =$ | 825 Ans. |

(6.)

| | |
|---------------------------|--------------------|
| $8,000 + 3,500 + 4,500 =$ | 16,000 |
| $24,000 - 16,000 =$ | 8,000 dolls., Ans. |

(7.)

$16,830 - 9,460 =$

$7,370 + 2,000 =$

$7,370$

$9,370 \text{ dolls.}$

(8.)

$125 + 75 + 58 =$

$275 - 258 =$

258

17 dolls.

MULTIPLICATION.

(ART. 51, p. 38.)

| | | | |
|-----|------------|-----|--------------|
| 9. | Ans. 1,176 | 18. | Ans. 302,205 |
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(37.) 75452
 47
 528164
 301808
 3546244 Ans.

(40.) 137
 35
 685
 411
 4795 Ans.

(38.) 54302
 89
 488718
 434416
 4832878 Ans.

(41.) 567
 108
 4536
 567
 61236 Ans.

(39.) 784
 203
 2352
 1568
 159152 Ans.

(42.) 37
 25
 185
 74
 925
 5
 4625 Ans.

$$\begin{array}{r}
 (43.) \quad 17 \\
 \quad \quad 8 \\
 \hline
 \quad \quad 51 \\
 \quad \quad 111 \\
 \hline
 \quad \quad 51 \\
 \quad \quad 51 \\
 \hline
 \quad \quad 51 \\
 \hline
 5661 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (44.) \quad 7013 \\
 \quad \quad 1234 \\
 \hline
 \quad \quad 28052 \\
 \quad \quad 21039 \\
 14026 \\
 7013 \\
 \hline
 8654042 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (45.) \quad 486 \\
 \quad \quad 259 \\
 \hline
 \quad \quad 4374 \\
 \quad \quad 2430 \\
 \hline
 \quad \quad 972 \\
 \hline
 125874 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (46.) \quad 34618 \\
 \quad \quad 259 \\
 \hline
 \quad \quad 311562 \\
 173090 \\
 69236 \\
 \hline
 8966062 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (47.) \quad 80704 \\
 \quad \quad 432 \\
 \hline
 \quad \quad 161408 \\
 \quad \quad 242112 \\
 \hline
 \quad \quad 322816 \\
 \hline
 34864128 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (48.) \quad 31311 \\
 \quad \quad 1213 \\
 \hline
 \quad \quad 93933 \\
 \quad \quad 31311 \\
 \hline
 \quad \quad 62622 \\
 \hline
 \quad \quad 31311 \\
 \hline
 37980243 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (49.) \quad 93186 \\
 \quad \quad 4455 \\
 \hline
 \quad \quad 465930 \\
 \quad \quad 465930 \\
 \hline
 \quad \quad 372744 \\
 \hline
 \quad \quad 372744 \\
 \hline
 415143630 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (51.) \quad 15607 \\
 \quad \quad 3094 \\
 \hline
 \quad \quad 62428 \\
 \quad \quad 140463 \\
 \hline
 \quad \quad 46821 \\
 \hline
 48288058 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (52.) \quad 60121 \\
 \quad \quad 3108 \\
 \hline
 \quad \quad 480968 \\
 \quad \quad 60121 \\
 \hline
 180363 \\
 \hline
 186856068 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (55.) \quad 3403 \\
 \quad \quad 501 \\
 \hline
 \quad \quad 3403 \\
 17015 \\
 \hline
 1704903 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (56.) \quad 5121 \\
 \quad \quad 1002 \\
 \hline
 \quad \quad 10242 \\
 5121 \\
 \hline
 5131242 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (57.) \quad 61303 \\
 \quad \quad 701 \\
 \hline
 \quad \quad 61303 \\
 429121 \\
 \hline
 42973403 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (62.) \quad 485 \\
 \quad \quad 240 \\
 \hline
 \quad \quad 1940 \\
 970 \\
 \hline
 116400 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (63.) \quad 36500 \\
 \quad \quad 730 \\
 \hline
 \quad \quad 1095 \\
 2555 \\
 \hline
 26645000 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (64.) \quad 674200 \\
 \quad \quad 2104 \\
 \hline
 \quad \quad 26968 \\
 6742 \\
 \hline
 13484 \\
 \hline
 1418516800 \text{ Ans.}
 \end{array}$$

(PAGE 41.)

$$\begin{array}{r}
 (3.) \\
 24 \times 18 = 432 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (5.) \\
 2463 \times 9 = 22167 \text{ dolls., Ans.}
 \end{array}$$

$$\begin{array}{r}
 (8.) \\
 625 \times 8 = 5000 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (12.) \quad 365 \\
 \quad \quad 24 \\
 \hline
 \quad \quad 1460 \\
 730 \\
 \hline
 \quad \quad 8760 \\
 68000 \\
 \hline
 \quad \quad 7008 \\
 5256 \\
 \hline
 595680000 \text{ miles.}
 \end{array}$$

DIVISION.

(ART. 62, pp. 47, 48.)

| | | | |
|-----|---------------------|-----|--------------------------|
| 6. | Ans. 503 | 13. | Ans. 55884 $\frac{2}{3}$ |
| 7. | 2203 $\frac{2}{3}$ | 16. | 72262 |
| 8. | 20424 $\frac{1}{3}$ | 18. | 1816141 $\frac{1}{3}$ |
| 11. | 30052 | 21. | 1234 |

(PAGE 48.)

2412 $\frac{1}{2}$ | 7.

(ART. 63, pp. 50, 51.)

| | | | |
|-------|-----------------------------|-------|------------------------------|
| 4. | Ans. 179 $\frac{7}{8}$ | (17.) | 35)10000(285 $\frac{2}{3}$ |
| 8. | 546 $\frac{3}{17}$ | | <u>70</u> |
| 10. | 1316 $\frac{1}{5}$ | | <u>300</u> |
| 13. | 835 | | <u>280</u> |
| 14. | 2671 $\frac{17}{365}$ | | <u>200</u> |
| | | | <u>175</u> |
| (15.) | 17)13354(785 $\frac{2}{17}$ | | <u>25</u> |
| | <u>119</u> | (18.) | 110)10064(91 $\frac{4}{110}$ |
| | <u>145</u> | | <u>990</u> |
| | <u>136</u> | | <u>164</u> |
| | <u>94</u> | | <u>110</u> |
| | <u>85</u> | | <u>54</u> |
| | <u>9</u> | (19.) | 73)45078(617 $\frac{2}{3}$ |
| | | | <u>438</u> |
| (16.) | 62)3406(54 $\frac{2}{62}$ | | <u>127</u> |
| | <u>310</u> | | <u>73</u> |
| | <u>306</u> | | <u>548</u> |
| | <u>248</u> | | <u>511</u> |
| | <u>58</u> | | <u>37</u> |

$$(20.) \quad 222)111111(500\frac{111}{222}$$

$$\begin{array}{r} 1110 \\ \hline 111 \end{array}$$

$$(21.) \quad 51)60702(1190\frac{12}{51}$$

$$\begin{array}{r} 51 \\ \hline 97 \\ \hline 51 \\ \hline 460 \\ \hline 459 \\ \hline 12 \end{array}$$

$$(22.) \quad 55)13415(243\frac{5}{55}$$

$$\begin{array}{r} 110 \\ \hline 241 \\ \hline 220 \\ \hline 215 \\ \hline 165 \\ \hline 50 \end{array}$$

$$(23.) \quad 121)45630(377\frac{13}{121}$$

$$\begin{array}{r} 363 \\ \hline 933 \\ \hline 847 \\ \hline 860 \\ \hline 847 \\ \hline 13 \end{array}$$

$$24) \quad 60)23218(386\frac{8}{60}$$

$$\begin{array}{r} 180 \\ \hline 521 \\ \hline 480 \\ \hline 418 \\ \hline 360 \\ \hline 58 \end{array}$$

$$(25.) \quad 123)63125(513\frac{26}{123}$$

$$\begin{array}{r} 615 \\ \hline 162 \\ \hline 123 \\ \hline 395 \\ \hline 369 \\ \hline 26 \end{array}$$

$$(26.) \quad 216)1554768(7198$$

$$\begin{array}{r} 1512 \\ \hline 427 \\ \hline 216 \\ \hline 2116 \\ \hline 1944 \\ \hline 1728 \\ \hline 1728 \end{array}$$

$$(27.) \quad 81)200204(2471\frac{54}{81}$$

$$\begin{array}{r} 162 \\ \hline 382 \\ \hline 324 \\ \hline 580 \\ \hline 567 \\ \hline 134 \\ \hline 81 \\ \hline 53 \end{array}$$

$$(28.) \quad 102)100000(980\frac{40}{102}$$

$$\begin{array}{r} 918 \\ \hline 820 \\ \hline 816 \\ \hline 40 \end{array}$$

(29.) 1023)40060(39¹⁶³₁₀₂₃3069

9370

9207

163

(30.) 27)8317(308¹₂₇81

217

216

1

(31.) 642)6421284(10002

642

1284

1284(32.) 3102)120345(38²⁴⁶⁹₃₁₀₂9306

27285

24816

2469

(33.) 1269)6346269(5001

6345

1269

1269

(ART. 64, p. 52.)

(36.)

67

(38.)

85⁷⁶¹₁₀₀₀

(40.)

8³⁴⁴⁴₁₀₀₀₀

(ART. 65, p. 53.)

(43.) 7|0)2212|0

316

(44.) 9|00)8298|00

922(45.) 19|00)402|20(21³²⁰₁₉₀₀38

22

19

8

(46.) 16|00)1370|00(85¹³³⁸₁₆₀₀128

90

80

10

(47.) 5|00)899|52

179⁴⁵²₅₀₀(48.) 12|000)131|127(10¹¹²⁷₁₂₀₀₀12

11127

| | | |
|---|--|--|
| <p>(49.) 306'000)4590'000(15</p> <div style="margin-left: 100px;"> <u>306</u> 1530 <u>1530</u> </div> | | <p>(50.) 1203'00)1383'15'00(115</p> <div style="margin-left: 100px;"> <u>1203</u> 1804 <u>1203</u> 6015 <u>6015</u> </div> |
|---|--|--|

(51.) 4'00000)8'03402

2 3402
~~400000~~

(52.) 89'0000)1157'9112(13 ~~890000~~

89
 267
267

(53.) 3261'00)36789'00(11 ~~326100~~

3261
 4179
3261
 918

(PAGES 53, 54.)

| | | | | |
|------|----------|------|--|---------|
| (4.) | Ans. 109 | (8.) | | Ans. 21 |
| (5.) | 365 | | | |

(10.) 15'000)2653'062(176 ~~15000~~

15
 115
105
 103
90
 13

REVIEW EXERCISES.

(PAGES 54, 55.)

(2.) $3094 \overline{) 48288058} (15607$

$$\begin{array}{r}
 3094 \\
 \hline
 17348 \\
 15470 \\
 \hline
 18780 \\
 18564 \\
 \hline
 21658 \\
 21658 \\
 \hline
 \end{array}$$

(4.) $540 - 512 = 28 \times 8 = 224$ Ans.

(5.) $160 \times 80 = 12800$; $220 \times 65 = 14300$; $12800 + 14300 = 27100$ dolls., Ans.

(7.) $45 \times 30 = 1350$; $1350 - 800 = 550$ dolls., Ans.

(9.) $105 \times 15 = 1575$; $5500 - 1575 = 3925$; $3925 \div 157 = 25$ shares, Ans.

(10.) $60 \times 50 = 3000$; $18050 - 3000 = 15050$; $15050 \div 50 = 301$ acres., Ans.

(11.) $50 \times 5 = 250$; $250 \div 2 = 125$; $125 \times 7 = 875$; $875 + 250 = 1125$ dolls., Ans.

(12.) $168 \times 4 = 672$; $672 + 35 = 707$; $168 + 707 = 875$; $875 \times 3 = 2625$; $2625 - 1200 = 1425$; $168 + 707 + 1425 = 2300$ acres., Ans.

REVIEW EXERCISES.

(PAGE 59.)

| | | | |
|-------|----------|-------|--------------------|
| (2.) | Ans. 917 | (12.) | 39792 |
| (3.) | 613 | | 692 |
| (4.) | 3473 | | 23)39100(1700 Ans. |
| (6.) | 64 | | 23 |
| (9.) | 168465 | | 161 |
| (11.) | 11231 | | 161 |

- (13.) $115 \times 5 = 575$; $575 \div 4 = 579$, Ans.
 (14.) $579 - 4 = 575$; $575 \div 5 = 115$, Ans.
-

ARITHMETICAL ANALYSIS.

(ART. 75, pp. 60-62.)

- (2.) $825 \div 11 = 75$; $75 \times 7 = 525$, Ans.
 (3.) $1560 \div 120 = 13$; $13 \times 139 = 1807$, Ans.
 (4.) $1807 \div 139 = 13$; $13 \times 120 = 1560$, Ans.
 (5.) $2440 \div 4 = 610$; $610 \times 9 = 5490$ miles, Ans.
 (7.) $21 \times 13 = 273$; $273 \div 39 = 7$ days, Ans.
 (8.) $57 \times 2 = 114$; $114 \div 19 = 6$ dolls., Ans.
 (9.) $30 \times 90 = 2700$; $2700 \div 540 = 5$ dolls., Ans.
 (11.) $3040 \div 19 = 160$; $2240 \div 160 = 14$ horses, Ans.
 (12.) $1380 \div 23 = \$60$; $1980 \div 60 = 33$ men, Ans.
 (13.) $93 \div 31 = 3$; $87 \div 3 = 29$ horses, Ans.
 (14.) $912 \div 16 = 57$; $17670 \div 57 = 310$ hhds., Ans.
 (16.) $20 + 10 + 5 = 35$; $11900 \div 35 = 340$, Ans.
 (17.) $60 + 80 = 140$; $11200 \div 140 = 80$ acres, Ans.
 (18.) $175 + 90 = 265$; $3445 \div 265 = 13$; $90 \times 13 = 1170$
 dollars received for colts; $175 \times 13 = 2275$ dollars
 received for horses.
 (20.) $5963 - 321 = 5642$; $5642 \div 2 = 2821$, No. of B.'s
 votes; $2821 + 321 = 3142$, No. of A.'s votes.
 (21.) $1200 - 360 = 840$; $840 \div 2 = 420$, distance one trav-
 eled; $420 + 360 = 780$, distance the other traveled.
 (22) Samuel receives 50 dollars more than Edmund, then
 Ernest receives 150 dollars more than Samuel, or 200
 dollars more than Edmund. $50 + 200 = 250$; 1350
 $- 250 = 1100$; $1100 \div 3 = 366\frac{2}{3}$ dollars, Edmund's
 share; $366\frac{2}{3} + 50 = 416\frac{2}{3}$ dollars, Samuel's share;
 $416\frac{2}{3} + 150 = 566\frac{2}{3}$ dollars, Ernest's share.

- (8.) $1501.50 \div 13.65 = 110$ barrels, Ans.
- (10.) Ans. \$4.25
- (11.) $1774.25 \div 47 = \$37.75$, Ans.
- (13.) $\$260.50 \times 316 = \82318 , Ans.
- (14.) $\$194.625 \div 519 = \$.375$, or $37\frac{1}{2}$ cents, Ans.
- (15.) $\$.27 \times 65 = \17.55 ; $\$.65 \times 15 = \97.50 ; $\$17.55 + 97.50 = \115.05 , Ans.
- (16.) $\$3.25 - \$.50 = \$2.75 = 275$ cts.; $\$825 = 82500$ cts.; $82500 \div 275 = 300$ days, Ans.
- (17.) $\$25 = 2500$ cts.; $2500 \div 200 = 12\frac{1}{2}$ cts., Ans.
- (18.) $\$.125 = 125$ mills; $\$25 = 25000$ mills; $25000 \div 125 = 200$ lbs., Ans.
- (19.) 312 pounds $\times 5 = 1560$ pounds; $\$491.40 = 49140$ cts.; 49140 cts. $\div 1560 = \$.315$, Ans.
- (20.) $\$.15 + \$.12\frac{1}{2} + \$.25 = \$.52\frac{1}{2}$, or $\$.525$; $\$.525 \times 365 = \$191.62\frac{1}{2}$, Ans.

(ART. 88, p. 73.)

- (2.) $\$235.25 - 37.50 = 198.75$; $\$198.75 = 19875$ cents; $\$1.75 = 175$ cts.; $19875 \div 175 = 113$ bushels, Ans.
- (3.) $\$8 \times 12 = \96 ; $\$6 \times 17 = \102 ; $\$96 + 102 = \198 ; $\$200 - \$198 = \$2$, Ans.
- (4.) 25 cts. $\times 150 = 3750$ cts.; $3750 \div 50 = 75$ arithmetics, Ans.
- (5.) $\$1.25 \times 600 = \750.00 ; $\$750.00 \div 160 = \$4.68\frac{3}{4}$, Ans.
- (6.) $\$7.25 \times 300 = \2175.00 ; $2175 - 1515 = \$660.00$; $660.00 \div 4.40 = 150$ cords, Ans.
- (7.) $\$.65 \times 50 = \32.50 ; $\$.15 \times 120 = \18.00 ; $\$32.50 - \$18.00 = \$14.50$, Ans.
- (8.) 32 cts. $\times 14 = 448$ cts.; $448 \div 28 = 16$ pounds, Ans.
- (9.) $\$.30 \times 475 = \142.50 ; $\$.50 \times 76 = \38.00 ; $\$142.50 + \$38.00 = \$180.50$; $180.50 \div 9.50 = 19$ barrels, Ans.

(ART. 91, pp. 74, 75.)

| | | | |
|------|------------------------------|------|-------------------------------|
| (1.) | $\$.50 \times 100 = \50.00 | (2.) | $\$.63 \times 210 = \132.30 |
| | $.14 \times 150 = 21.00$ | | $1.50 \times 500 = 750.00$ |
| | $.42 \times 60 = 25.20$ | | $.40 \times 250 = 100.00$ |
| | $.60 \times 132 = 79.20$ | | $.60 \times 150 = 90.00$ |
| | $12.50 \times 10 = 125.00$ | | $9.50 \times 50 = 475.00$ |
| | Ans. $\$300.40$ | | Ans. $\$1547.30$ |

| | |
|------|-------------------------------|
| (3.) | $\$4.25 \times 25 = \106.25 |
| | $4.25 \times 30 = 127.50$ |
| | $1.25 \times 20 = 25.00$ |
| | $7.50 \times 3 = 22.50$ |
| | $10.00 \times 15 = 150.00$ |
| | Ans. $\$431.25$ |

(ART. 94, p. 76.)

(2.) BALTIMORE, Nov. 16, 1866.

MR. JAMES MCCLINTOCK,

TO ANDREW SAULSBURY,

Dr.

| | | |
|---------|----------------------------------|--------------|
| Oct. 1. | For 110 bushels of corn, at .75, | \$82.50 |
| " 7. | " 3 bbls. of flour, at \$7.50, | 22.50 |
| Nov. 5. | " 62 bushels of oats, at .43, | <u>26.66</u> |
| | | \$131.66 |

Cr.

| | | |
|---------|---------------------------------|--------------|
| Oct. 5. | By 6 M. extra shingles, at \$6, | \$36.00 |
| Nov. 1. | " Cash, | 60.00 |
| " 10. | " Bill of labor, | 8.66 |
| " 16. | " Due Bill, | <u>27.00</u> |
| | | \$131.66 |

Received payment,

for

ANDREW SAULSBURY.

(ART. 95, p. 77.)

| | | | | | |
|----|------|----------|----|------|-----------|
| 2. | Ans. | \$744.55 | 4. | Ans. | \$1727.80 |
| 3. | | \$970.05 | | | |

FACTORING.

(ART. 115, p. 82.)

| | | | | | |
|----|------|---------------|----|------|-----------------|
| 2. | Ans. | $2^2, 3^2, 7$ | 7. | Ans. | 13, 17, 29 |
| 4. | | $3^2, 709$ | 9. | | 2, 3, 7, 11, 17 |

(ART. 116, p. 83.)

| | | | | |
|-----|--|--|------|------|
| 13. | | | Ans. | 3, 5 |
|-----|--|--|------|------|

(ART. 117, p. 84.)

| | | | | | |
|----|------|--------|----|------|--------|
| 3. | Ans. | 190680 | 6. | Ans. | 919350 |
|----|------|--------|----|------|--------|

(ART. 118, p. 85.)

| | | | | | |
|----|------|-------------------|----|------|-------------------|
| 4. | Ans. | 876 | 9. | Ans. | $1922\frac{2}{3}$ |
| 7. | | $4614\frac{2}{3}$ | | | |

(ART. 119, p. 86.)

| | | | | |
|-----|--|--|------|----------------|
| 15. | | | Ans. | $1\frac{1}{3}$ |
|-----|--|--|------|----------------|

(PAGES 86, 87.)

(2.) $\frac{3}{105 \times \frac{21}{35}} = 63 \text{ pounds, Ans.}$

(3.) $\frac{40}{5.60 \times 2} = 80 \text{ pounds, Ans.}$

$$(4.) \quad \begin{array}{r} 3 \\ 9 \quad 2 \\ 162 \times 50 \\ 18 \times 75 \\ 3 \end{array} = 6 \text{ loads, Ans.}$$

$$(5.) \quad \begin{array}{r} 30 \\ 90 \\ 360 \times 11 \\ 3 \times 56 \\ 4 \end{array} = 30 \text{ cts. per pound, Ans.}$$

$$(6.) \quad \begin{array}{r} 3 \quad 8 \\ 150 \times 40 \\ 250 \\ 5 \end{array} = 24 \text{ days, Ans.}$$

$$(7.) \quad \begin{array}{r} 41 \quad 3 \\ 161 \times 9 \\ 12 \\ 4 \end{array} = 123 \text{ dictionaries, Ans.}$$

$$(8.) \quad \begin{array}{r} 45 \\ 135 \\ 40.50 \\ 30 \times 3 \end{array} = \$45, \text{ Ans.}$$

$$(9.) \quad \begin{array}{r} 3 \\ 225 \quad 4 \\ 110.25 \times 80 \\ 49 \times 60 \times .75 \\ 3 \end{array} = 4 \text{ bales, Ans.}$$

(ART. 122, p. 88.)

$$\begin{array}{r} 8. \quad \text{Ans. } 33 \mid 7. \quad \text{Ans. } 10 \\ 6. \quad 17 \end{array}$$

(ART. 124, p. 89.)

$$10. \quad \text{Ans. } 12$$

(PAGE 90.)

(1.) $356)788(2$

$\underline{712}$

$76)356(4$

$\underline{304}$

$52)76(1$

$\underline{52}$

$24)52(2$

$\underline{48}$

$4)24(6$

$\underline{24}$

Ans. 4 rods.

(2.) $15)18(1$

$\underline{15}$

$3)15(5$

$\underline{15}$

Ans. 3 feet.

(3.) $375)450(1$

$\underline{375}$

$75)375(5$

$\underline{375}$

Ans. 75 acres.

$75)525(7$

$\underline{525}$

(4.) $720)1008(1$

$\underline{720}$

$288)720(2$

$\underline{576}$

$144)288(2$

$\underline{288}$

$144)1152(8$

$\underline{1152}$

Ans. 144 bushels.

(5.)

$679)5901(8$

$\underline{5432}$

$469)679(1$

$\underline{469}$

$210)469(2$

$\underline{420}$

$49)210(4$

$\underline{196}$

$14)49(3$

$\underline{42}$

$7)6734$

$\underline{962}$

$7)14(2$

$\underline{14}$

7 is the greatest Common Divisor ; therefore \$7 is the price per head ; $679 \div 7 = 97$ sheep, A could purchase ; $5901 \div 7 = 843$ sheep, B could purchase ; $6734 \div 7 = 962$ sheep, C could purchase.

(ART. 128, p. 92.)

$$8. \quad \text{Ans. } 252 \mid 6. \quad \text{Ans. } 12600$$

(ART. 129, p. 93.)

$$11. \quad \text{Ans. } 390 \mid 13. \quad \text{Ans. } 5250$$

(PAGE 93.)

(1.) The least sum required must be the least common multiple of \$3, \$4, \$5, \$6.

$$3 \overline{) 3, 4, 5, 6}$$

$$2 \overline{) 1, 4, 5, 2}$$

$$1, 2, 5, 1$$

$$3 \times 2 \times 2 \times 5 = \$60, \text{ Ans.}$$

$$(2.) \quad 2 \overline{) 10, 12, 8, 18}$$

$$2 \overline{) 5, 6, 4, 9}$$

$$3 \overline{) 5, 3, 2, 9}$$

$$5, 1, 2, 3$$

$$2 \times 2 \times 3 \times 5 \times 2 \times 3 =$$

$$[360 \text{ minutes, Ans.}]$$

$$(3.) \quad 6 \overline{) 12, 18, 30, 36}$$

$$2 \overline{) 2, 3, 5, 6}$$

$$3 \overline{) 1, 3, 5, 3}$$

$$1, 1, 5, 1$$

$$6 \times 2 \times 3 \times 5 = \$180, \text{ smallest sum of money;}$$

$$180 \div 12 = 15 \text{ men at } \$12 \text{ per month;}$$

$$180 \div 18 = 10 \text{ men at } \$18 \text{ per month;}$$

$$180 \div 30 = 6 \text{ men at } \$30 \text{ per month;}$$

$$180 \div 36 = 5 \text{ men at } \$36 \text{ per month.}$$

COMMON FRACTIONS.

(ART. 140, p. 96.)

| | | | |
|-----|----------------------|-----|-----------------------|
| 16. | Ans. $\frac{17}{25}$ | 22. | Ans. $\frac{88}{300}$ |
| 17. | $\frac{2}{50}$ | 23. | $\frac{51}{640}$ |
| 18. | $\frac{11}{12}$ | 24. | $\frac{108}{1000}$ |
| 19. | $\frac{28}{31}$ | 25. | $\frac{167}{928}$ |
| 20. | $\frac{13}{62}$ | 26. | $\frac{22000}{21}$ |
| 21. | $\frac{11}{15}$ | | |

(ART. 143, p. 100.)

| | | |
|----|--------------------------|--------------------|
| 2. | Ans. $\frac{3}{4} 10.$ | Ans. $\frac{7}{8}$ |
| 5. | $\frac{3}{5} 13.$ | $2\frac{2}{3}$ |

(ART. 144, p. 101.)

| | | |
|----|---------------------------|----------|
| 2. | Ans. $4\frac{1}{6} 10.$ | Ans. 130 |
| 5. | $11 $ | |

(ART. 145, p. 101.)

| | | |
|----|---------------------------|--------------------------------|
| 2 | Ans. $\frac{22}{5} 10.$ | Ans. $3\frac{1}{4}\frac{2}{3}$ |
| 6. | $12\frac{5}{6} $ | |

(ART. 146, p. 102.)

| | | |
|-----|--|--------------------------------|
| 15. | | Ans. $2\frac{2}{3}\frac{4}{5}$ |
|-----|--|--------------------------------|

(ART. 149, p. 104.)

| | | |
|----|--|--|
| 7. | Ans. $\frac{18}{20}, \frac{6}{20}, \frac{7}{20} 11.$ | Ans. $\frac{80}{120}, \frac{125}{120}, \frac{120}{120}, \frac{124}{120}$ |
|----|--|--|

(ART. 150, p. 104.)

| | | |
|-----|--|--|
| 14. | | Ans. $4\frac{8}{12}, 4\frac{9}{12}, 4\frac{32}{12}, 2\frac{7}{12}$ |
|-----|--|--|

(ART. 152, p. 105.)

| | | |
|----|---|---------------------|
| 7. | Ans. $\frac{5}{2} = 1\frac{1}{2} 11.$ | Ans. $2\frac{2}{3}$ |
|----|---|---------------------|

(ART. 153, p. 106.)

| | | |
|-----|----------------------------|-----------------------|
| 18. | Ans. $5\frac{7}{10} 21.$ | Ans. $55\frac{7}{10}$ |
|-----|----------------------------|-----------------------|

(ART. 155, p. 107.)

| | | |
|----|----------------------------|--------------------|
| 7. | Ans. $\frac{32}{17} 12.$ | Ans. $\frac{1}{5}$ |
| 9. | $\frac{1}{7\frac{1}{2}} $ | |

(PAGE 108.)

| | | | |
|------|--|------|---|
| (2.) | $\frac{1}{2} = \frac{18}{36}$ | (3.) | $6 + 8 + 9 = 23$ |
| | $\frac{2}{3} = \frac{12}{36}$ | | $\frac{3}{4} = \frac{6}{8}, \frac{1}{2} = \frac{4}{8}$ |
| | $\frac{1}{3} + \frac{1}{3} + \frac{2}{3} = \frac{4}{3}, \text{Ans.}$ | | $\frac{6}{8} + \frac{6}{8} + \frac{4}{8} = \frac{16}{8} = 1\frac{1}{2}$ |
| | | | $23 + 1\frac{1}{2} = 24\frac{1}{2}, \text{Ans.}$ |

(4.) $9 + 4 = 13$
 $\frac{2}{7} = \frac{22}{77}$ and $\frac{5}{11} = \frac{35}{77}$
 $\frac{22}{77} + \frac{35}{77} = \frac{57}{77}$
 $13 + \frac{57}{77} = 13\frac{57}{77}$ years, Ans.

(6.) $37\frac{5}{8} = 37\frac{65}{112}$
 $8\frac{9}{13} = 8\frac{81}{117}$

Taking 1 from 37 leaves 36; the 1 taken reduced = $\frac{1}{117}$,
 $\frac{1}{117} + \frac{81}{117} = \frac{82}{117}$; $\frac{82}{117} - \frac{81}{117} = \frac{1}{117}$.
 $36 - 8 = 28$, and $28 + \frac{1}{117} = 28\frac{1}{117}$, Ans.

(7.) $16\frac{1}{3} = \frac{98}{6}$, and $12\frac{1}{2} = \frac{75}{6}$.
 $\frac{98}{6} - \frac{75}{6} = \frac{23}{6} = 3\frac{5}{6}$ barrels, Ans.

(8.) $131\frac{7}{8} + 160\frac{9}{16} = 292\frac{7}{16}$
 $292\frac{7}{16} = 292\frac{33}{8}$, and $150\frac{7}{10} = 150\frac{231}{80}$
 $292\frac{33}{8} - 150\frac{231}{80} = 142\frac{7}{80}$, Ans.

(ART. 158, p. 109.)

5. Ans. $\frac{5}{8} \frac{1}{2} | 10$. Ans. 19

(ART. 159, p. 110.)

16. Ans. 162

(ART. 160, p. 111.)

6. Ans. $56 | 10$. Ans. $6\frac{1}{2}$

(ART. 161, p. 111.)

14. Ans. $3298\frac{11}{16}$

(ART. 162, p. 112.)

5. Ans. $2\frac{1}{2}$

(ART. 164, p. 113.)

15. Ans. $19\frac{1}{2}$

(PAGE 113.)

(2.) $\$7 \times 196 = \$1372 = \$171\frac{1}{2}$, Ans.

(3.) $\$7\frac{2}{5} = \2 ; $\$2 \times 26 = \$7\frac{2}{5} = \$15\frac{2}{5}$, Ans.

(5.) $\$7 \times 1\frac{1}{2} = \$10\frac{1}{2} = \$6\frac{2}{3}, \text{ Ans.}$

(8.) $2\frac{2}{3} \text{ yds.} \times 4 = 10\frac{2}{3} \text{ yds., Ans.}$

(9.) $\$16\frac{1}{2} = \$\frac{32}{2}; \$\frac{32}{2} \times \frac{1}{4} = \$\frac{8}{1}$
 $\$16\frac{1}{2} \times \frac{8}{8} = \$\frac{131}{8} = \$31\frac{3}{8}, \text{ Ans.}$

(10.) $\frac{5}{16} \text{ of } \frac{64}{1} \text{ acres} = 20 \text{ acres;}$
 $\frac{4}{5} \text{ of } \frac{20}{1} \text{ acres} = 16 \text{ acres, Ans.}$

(ART. 166, p. 114.)

(5.) Ans. $\frac{2}{67} | (9.)$ Ans. $2\frac{1}{10}$

(ART. 168, p. 116.)

(8.) Ans. $38\frac{2}{3} | (12.)$ Ans. $61\frac{1}{2}$

(ART. 169, p. 117.)

(6.) Ans. $1\frac{5}{27} | (11.)$ Ans. $1\frac{2}{60} = 1\frac{1}{15}$

(ART. 171, p. 118.)

(20.) Ans. $\frac{3}{70}$

(PAGE 119.)

(1.) $\$3 \div 4 = \$\frac{3}{4} \times \frac{1}{4} = \$\frac{3}{16}, \text{ Ans.}$

(2.) $1\frac{1}{8} = \frac{9}{8}; \frac{9}{8} \div 5 = \frac{\frac{9}{8} \times 3}{8 \times 5} = \frac{27}{40} \text{ Ans.}$

(3.) $\$19\frac{3}{4} = \$\frac{79}{4}; \$\frac{79}{4} \div 10 = \$\frac{\frac{79}{4} \times 11}{4 \times 10} = \$11\frac{3}{8}, \text{ Ans.}$

$$(4.) \quad \$250\frac{3}{8} = \$250\frac{3}{8}; \quad \$250\frac{3}{8} \div 19 = \$\frac{2003}{8 \times 19} = \$215\frac{2}{19}$$

$$[= \$13\frac{27}{19}, \text{Ans.}]$$

$$(6.) \quad \$1\frac{3}{5} = \$2\frac{3}{5}; \quad \$2\frac{3}{5} \div \frac{2}{3} = \$\frac{23 \times 3}{5 \times 2} = \$\frac{69}{10} = 6\frac{9}{10}, \text{Ans.}$$

$$(7.) \quad 104\frac{2}{5} = 122; \quad \$87 \div 122 = \$\frac{87 \times 5}{522} = \$\frac{5}{6}, \text{Ans.}$$

$$(9.) \quad \$9\frac{1}{2} = \$1\frac{9}{2} = \$5\frac{7}{2}, \text{ and } \$3\frac{1}{6} = \$1\frac{9}{6}$$

$$1\frac{9}{6} \div 5\frac{7}{2} = \frac{19}{57} = \frac{1}{3}, \text{Ans.}$$

$$(10.) \quad 87 \div \frac{5}{8} = \frac{87 \times 6}{5} = 104\frac{2}{5}, \text{Ans.}$$

$$(11.) \quad 1806\frac{7}{8} = 1445\frac{5}{8}, \text{ and }$$

$$17\frac{1}{2} = 3\frac{5}{2} = 14\frac{0}{2}$$

$$1445\frac{5}{8} \div 14\frac{0}{2} = 103\frac{1}{4}, \text{hours, Ans.}$$

RELATION OF NUMBERS.

(ART. 174, p. 121.)

$$(11.) \quad \text{Ans. } \frac{2}{3} = \frac{2}{3}$$

(PAGE 121.)

$$(1.) \quad 4\frac{2}{5} = \frac{8}{5}, \text{Ans.} \quad (2.) \quad \frac{1\frac{1}{2}}{6} = \frac{1}{4}, \text{Ans.}$$

$$(4.) \quad \frac{12\frac{1}{2}}{18\frac{3}{4}} = \frac{2}{3}; \quad \frac{2}{3} \text{ of } \$30 = \$20, \text{Ans.}$$

$$(5.) \quad 3\frac{5}{2} \text{ Ans.}$$

$$(6.) \quad \frac{3}{8} \text{ of } 320 = 120$$

$$120 + 40 = 160$$

$$160 = \frac{1}{2}, \text{Ans.}$$

REVIEW EXERCISES.

(PAGES 122, 123.)

- (1.) $\frac{8619 \div 329}{6251 \div 329} = \frac{26\frac{11}{19}}{19} = 1\frac{1}{9}, \text{ Ans.}$
- (2.) $\frac{51 \times 11}{61 \times 11} = \frac{561}{671}, \text{ Ans.}$
- (3.) $\frac{100 \times 199}{1 \times 199} = \frac{19900}{199}; \frac{19900}{199} + \frac{199}{199} = \frac{20000}{199}, \text{ Ans.}$
- (4.) $\left. \begin{array}{l} \frac{2}{3} = \frac{20}{30} \\ \frac{4}{5} = \frac{24}{30} \\ \frac{6}{6} = \frac{25}{30} \\ \frac{3}{10} = \frac{9}{30} \end{array} \right\} \text{ Ans.}$
- (5.) $19\frac{9}{10} = \frac{199}{10} = \frac{1194}{60}$
 $51\frac{5}{6} = \frac{311}{6} = \frac{3110}{60}$
 $63\frac{3}{4} = \frac{255}{4} = \frac{3825}{60}$
 $\frac{1194}{60} + \frac{3110}{60} = \frac{4304}{60}; \frac{4304}{60} - \frac{3825}{60} = \frac{479}{60} = 7\frac{19}{60}, \text{ Ans.}$
- (6.) Joseph has $\$13\frac{3}{20}$;
 Andrew has $\$13\frac{3}{20} + \$7\frac{2}{5} = \$20\frac{3}{4}$;
 Henry has $\$13\frac{3}{20} + \$20\frac{3}{4} = \$33\frac{9}{10}$ } Ans.
- (7.) $\frac{5}{8} - \frac{2}{5} = \frac{25}{40} - \frac{16}{40} = \frac{9}{40}, \text{ Ans.}$
- (8.) $\frac{2}{3} \text{ of } \frac{11}{16} = \frac{\frac{2}{3} \times 11}{3 \times 16} = \frac{22}{144} = \frac{11}{72}, \text{ Ans.}$
- (9.) $12\frac{1}{10} = \frac{121}{10}$
 $3\frac{2}{3} = \frac{11}{3}$
 $\frac{121}{10} \div \frac{11}{3} = \frac{121 \times 3}{10 \times 11} = \frac{33}{10} = 3\frac{3}{10}, \text{ Ans.}$

- (5.) $\frac{1}{4}$ of a pound will cost $\frac{1}{4}$ of \$.60 = \$.20
 $\frac{1}{4}$, or 1 pound, will cost \$.20 \times 4 = \$.80; and 553 $\frac{1}{4}$
 will cost
 $$.80 \times 553\frac{1}{4} = \442.60 , Ans.
- (6.) $\frac{1}{8}$ acre will cost $\frac{1}{8}$ of \$.75 = \$25
 $\frac{8}{8}$, or 1 acre, will cost \$25 \times 8 = \$200; and
 $7\frac{4}{5}$ acres will cost \$200 \times $7\frac{4}{5}$ = \$1560, Ans.
- (7.) $\$1560 \div 7\frac{4}{5} = \200
 $\frac{3}{8}$ of \$200 = \$75, Ans.
- (9.) \$1 will buy $\frac{1}{4}$ of $5\frac{3}{8}$ =
 $\frac{1}{4}$ of $4\frac{3}{8} = \frac{4}{8} \times \frac{3}{8}$ bushels
 $\$15$ will buy 15 times $\frac{4}{8} = 11\frac{3}{8}$ bushels, Ans.
- (10.) $\frac{1}{9}$ of a ton will cost $\frac{1}{9}$ of \$5.60 = \$.80
 $\frac{9}{9}$, or 1 ton, will cost \$.80 \times 9 = \$7.20
 $540 \div 720 = \frac{3}{4}$, Ans.
- (11.) $\$11\frac{1}{2} \div 19\frac{1}{2} = \$\frac{23}{39}$
 $2\frac{1}{8} \div \frac{23}{39} = \frac{23}{8} \div \frac{23}{39} = 4\frac{7}{8}$,
- (12.) $33\frac{1}{12} \div 4\frac{5}{8} = \frac{407}{12} \div \frac{37}{8} = \frac{407 \times 8}{12 \times 37} = \frac{22}{3} = 7\frac{1}{3}$
 $\$27\frac{1}{2} \div \$7\frac{1}{3} = \frac{55}{2} \div \frac{22}{3} = \frac{55 \times 3}{2 \times 22} = \frac{165}{44} = 3\frac{3}{4}$, Ans.
- (13.) $4\frac{2}{5} = \frac{22}{5}$; $\frac{22}{5} \div 11 = \frac{2}{5}$, and
 $7\frac{1}{5} = \frac{36}{5}$; $\frac{36}{5} \div \frac{2}{5} = 18$, Ans.
- (15.) The man can do $\frac{1}{12}$ in one day, the boy $\frac{1}{16}$ in one day,
 and $\frac{1}{12} + \frac{1}{16} = \frac{10}{120} + \frac{13}{120} = \frac{23}{120}$ what both can
 do in 1 day. It will then take as many days to do
 $\frac{1}{23}$, or the whole, as $\frac{23}{120}$ is found times in $\frac{1}{23}$ =
 $5\frac{1}{2}$ days, Ans.

- (16.) $\frac{1}{10} + \frac{1}{5} = \frac{3}{10} + \frac{2}{10} = \frac{5}{10} = \frac{1}{2}$
 $\frac{6}{5} \div \frac{1}{5} = 6$ days, Ans.
- (17.) The first will fill $\frac{1}{10}$ of it in one hour, the second $\frac{1}{15}$,
 and the third $\frac{1}{16}$
 $\frac{1}{10} + \frac{1}{15} + \frac{1}{16} = \frac{24}{240} + \frac{16}{240} + \frac{15}{240} = \frac{55}{240}$; $\frac{240}{55} \div \frac{55}{240} = 4\frac{4}{11}$ hours, Ans.
- (19.) $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$; $\frac{6}{6} - \frac{5}{6} = \frac{1}{6}$ remaining, therefore
 $\$400 = \frac{1}{6}$, and $\frac{6}{6}$, or the whole, = 6 times $\$400$, or
 $\$2400$
 $\$2400 - \$400 = \$2000$, Ans.
- (20.) $\frac{3}{4} + \frac{5}{12} = \frac{9}{12} + \frac{5}{12} = \frac{14}{12}$
 $\frac{24}{12} - \frac{14}{12} = \frac{10}{12}$, therefore, $75 = \frac{5}{4}$; $\frac{5}{4} = \frac{1}{5}$ of $75 = 15$;
 $\frac{24}{12} = 24$ times $15 = 360$, whole number of sheep.
 $\frac{3}{5}$ of $360 = 135$ in 1st pasture.
 $\frac{1}{12}$ of $360 = 150$ in 2d pasture.
- (21.) $\frac{2}{3} + \frac{7}{8} = \frac{16}{24} + \frac{21}{24} = \frac{37}{24}$
 $\frac{37}{24} - \frac{32}{24} = \frac{5}{24}$; therefore, $\$2000 = \frac{11}{31}$ of the cost of
 the mill, and $\frac{1}{31}$ of the cost = $\$2000 \div 31 =$
 $\$64\frac{16}{31}$; then $\frac{6}{31}$, or the whole cost, = 63 times
 $\$64\frac{16}{31} = \$4064\frac{16}{31}$; then $\frac{2}{3}$ of $\$4064\frac{16}{31} = \$903\frac{7}{15}$ is
 the sum A pays, and $\frac{7}{8}$ of $\$4064\frac{16}{31} = \$1161\frac{9}{15}$ is
 the sum B pays.
- (23.) If $\frac{3}{8}$ of the larger = $\frac{1}{2}$ the smaller,
 $\frac{1}{8}$ of the larger = $\frac{1}{3}$ of $\frac{1}{2}$ of the smaller = $\frac{1}{6}$, and $\frac{3}{8}$
 = 8 times $\frac{1}{6} = \frac{8}{6}$ of the smaller;
 since $\frac{6}{6}$ = the smaller, $\frac{8}{6} + \frac{6}{6} = \frac{14}{6} = \frac{7}{3}$ of the smaller:
 $\frac{1}{3}$ of $350 = 50$; then $\frac{7}{3}$, or the whole of the smaller,
 $50 \times 3 = 150$; $350 - 150 = 200$ the larger;
 or, if $\frac{1}{3}$ = 50 , $\frac{4}{3}$, or the larger = 4 times $50 = 200$,
 Ans.

(ART. 187, p. 133.)

9. Ans. .275

(ART. 190, p. 135.)

5. Ans. 1072.43845

(ART. 191, p. 136.)

5. Ans. 106.9993

(ART. 194, pp. 137, 138.)

8. Ans. 4312.5 | 12. Ans. 60000.10. 1.5 | 15. .00039765

(ART. 195, pp. 139, 140.)

7. Ans. 34.5 | 16. Ans. 182900.8. 345. | 18. 290.13. 9.875 | 20. 25.14. .9875 |

(PAGES 140, 141.)

(1.) $197.025 + 211 + 163.175 + 150.65 = 721.85$ miles,
Ans.(2.) $\$7691.55 + \$1006.45 = \$8698$, Ans.(3.)
$$\begin{array}{r} 640.000 \\ 221.125 \\ \hline 418.875 \end{array}$$
 acres, Ans.(4.) $17.75 \times 4.54 = \$80.585$, Ans.(5.) $1.236 \text{ lbs.} \times 13 = 16.068 \text{ lbs.}$, Ans.

| | |
|--|--|
| (6.) $\begin{array}{r} 19.95 \\ 20 \\ \hline \$399.00, \text{ Ans.} \end{array}$ | (7.) $\begin{array}{l} 14.5 + .5 = 15. \\ 14.5 - .5 = 14 \\ \text{Therefore } \frac{1}{4} = \text{Ans.} \end{array}$ |
|--|--|

$$\begin{array}{r}
 (8.) \quad 365.25 \\
 \underline{365.242264} \\
 .007736 \\
 \underline{400} \\
 3.094400 \text{ days, Ans.}
 \end{array}$$

$$\begin{array}{r}
 (9.) \quad 75.8)2274.0(30 \\
 \underline{2274} \\
 0 \\
 \$31.50 - \$30 = \$1.50, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (10.) \quad 39.3685)63360.0000(1609 + \text{ Ans.} \\
 \underline{393685} \\
 2399150 \\
 \underline{2362110} \\
 3704000 \\
 \underline{3543165} \\
 160835
 \end{array}$$

$$\begin{array}{r}
 (11.) \quad .375 \qquad \qquad \qquad 1.000 \\
 \underline{.25} \qquad \qquad \qquad = \qquad \underline{.625} \\
 .625 \qquad \qquad \qquad \qquad \qquad .375 \\
 .375)1500.000(4000, \text{ Ans.} \\
 \underline{1500} \\
 0000
 \end{array}$$

$$\begin{array}{r}
 (12.) \quad 65)0)487)5(7.50 \\
 \underline{455} \\
 325 \\
 \underline{325} \qquad \$8.25 \\
 7.50 \\
 .75, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (13.) \quad \$6400 \\
 \underline{.875} \\
 32000 \\
 44800 \\
 \underline{51200} \\
 \$5600.000, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (15.) \quad .9)6.66 \\
 \underline{7.4} \qquad 60.5 \\
 \underline{7.4} \\
 2420 \\
 \underline{4235} \\
 \$447.70, \text{ Ans.}
 \end{array}$$

$$(14.) \quad \frac{688}{8188} = \frac{7}{8} = .875, \text{ Ans.}$$

$$\begin{array}{r}
 (16.) \quad .60 \\
 \quad \quad .75 \\
 \hline
 1.35) 128.925 (95.5 \text{ bushels of each kind.} \\
 \quad \underline{1215} \\
 \quad \quad 742 \\
 \quad \quad \underline{675} \\
 \quad \quad \quad 675 \\
 \quad \quad \quad \underline{675}
 \end{array}$$

$$95.5 \times .60 = \$57.300 \text{ paid for the corn.}$$

$$95.5 \times .75 = \$71.625 \text{ paid for the barley.}$$

(PAGES 142, 143.)

$$\begin{array}{r}
 (2.) \quad 8.20 \\
 \quad \quad 25 \\
 \hline
 \quad \quad 4100 \\
 \quad \quad \underline{1640} \\
 \$205. \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 3.) \quad 56.70 \\
 \quad \quad 1.20 \\
 \hline
 \quad \quad 1134 \\
 \quad \quad \underline{567} \\
 \$68.04 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 (7.) \quad 53.725 \\
 \quad \quad 1.14 \\
 \hline
 \quad \quad 214900 \\
 \quad \quad 53725 \\
 \quad \quad \underline{53725} \\
 \$61.24650, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (4.) \quad 9.60 \\
 \quad \quad 12.5 \\
 \hline
 \quad \quad 4800 \\
 \quad \quad 1920 \\
 \quad \quad \underline{960} \\
 \$120. \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 (6.) \quad 31.684 \\
 \quad \quad 6.50 \\
 \hline
 \quad \quad 158420 \\
 \quad \quad \underline{190104} \\
 \$205.94600, \text{ Ans.}
 \end{array}$$

| | | | |
|------|-------------------|------------------|------|
| (8.) | 36.500 | 5.680 | 16 |
| | 40 | 50 | 5.25 |
| | <u>\$1460.000</u> | <u>\$284.000</u> | 80 |

32

80

\$84.00

284.00

1460.00

\$1828.00, Ans.

| | |
|-------|----------------------|
| (10.) | 2)2.560 |
| | 1.28 |
| | 21 |
| | <u>128</u> |
| | 256 |
| | <u>\$26.88, Ans.</u> |

| | |
|-------|----------------------|
| (11.) | 2)3.248 |
| | 1.624 |
| | 9.5 |
| | <u>8120</u> |
| | 14616 |
| | <u>\$15.428, Ans</u> |

| | |
|-------|--------------|
| (12.) | 2)96.880 |
| | 48.44 |
| | 2.5 |
| | <u>24220</u> |
| | 9688 |

\$121.100, Ans.

- (14.) Since the cost of the one is to that of the other as 5 to 7, if the cost of both together be divided into 5 + 7, or 12 equal parts, 5 of the parts, or $\frac{5}{12}$ will be the cost of the one; and 7 of the parts, or $\frac{7}{12}$ will be the cost of the other. Then,

$$\left. \begin{array}{l} \frac{5}{12} \text{ reduced to hundredths} = .41\frac{2}{3} \\ \frac{7}{12} \text{ reduced to hundredths} = .58\frac{1}{3} \end{array} \right\} \text{Ans.}$$

| | | |
|-------|--|--------|
| (15.) | 1 + 2 + 5 = 8 | |
| | 1st man has $\frac{1}{8} = .12\frac{1}{2}$ | } Ans. |
| | 2d " " $\frac{2}{8} = .25$ | |
| | 3d " " $\frac{5}{8} = .62\frac{1}{2}$ | |

$$\begin{aligned}
 (17.) \quad & .35 + .05 = 1.00 \\
 & 398.60 \div 100 = 3.986 \\
 & 3.986 \times 35 = 139.51 \\
 & 3.986 \times 65 = 259.09 \} \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (18.) \quad & 13 + 12 = 25 \\
 & \frac{1}{2}\frac{2}{3} \text{ of } 475 = 247 \text{ boys} \\
 & \frac{1}{2}\frac{2}{3} \text{ of } 475 = 228 \text{ girls} \} \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (19.) \quad & .76 + .14 + .10 = 1.00 \\
 & .76 \text{ of } 2000 = 1520 \text{ lbs. nitre} \\
 & .14 \text{ of } 2000 = 280 \text{ lbs. charcoal} \\
 & .10 \text{ of } 2000 = 200 \text{ lbs. sulphur.}
 \end{aligned}$$

DECIMAL WEIGHTS AND MEASURES.

(ART. 241, p. 161.)

$$(2.) \quad .4047 \times 150 = 60.705 \text{ hectares, Ans.}$$

$$\begin{array}{r}
 (3.) \quad 2.837 \\
 \quad \quad 2.5 \\
 \hline
 \quad 14185 \\
 \quad 5674 \\
 \hline
 \quad 7.0925, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (4.) \quad 3.625 \\
 \quad \quad 15 \\
 \hline
 \quad 18125 \\
 \quad 3625 \\
 \hline
 54.375 \text{ steres, Ans.}
 \end{array}$$

$$\begin{array}{r}
 (5.) \quad 2.2046 \\
 \quad \quad 16.25 \\
 \hline
 \quad 110230 \\
 \quad 44092 \\
 \hline
 \quad 132276 \\
 \quad 22046 \\
 \hline
 35.824750 \text{ av. lbs., Ans}
 \end{array}$$

$$\begin{array}{r}
 (6.) \quad .9071 \times 100 = 90.71 \\
 \quad \quad \quad \text{[tonneaux, Ans}
 \end{array}$$

(ART. 242, p. 161.)

- (2.) $1 \times .9465 = \$.9465$, Ans.
 (3.) $.4047 \times 10 = 4.047$ hectoliter, Ans.
 (4.) $2.471 \times 45 = 111.195$ bushels, Ans.

DENOMINATE NUMBERS.

(ART. 245, p. 163.)

- | <p>(2.)</p> <table border="0"> <thead> <tr> <th style="text-align: right;">tons.</th> <th style="text-align: right;">cwt.</th> </tr> </thead> <tbody> <tr> <td style="text-align: right;">3</td> <td style="text-align: right;">15</td> </tr> <tr> <td style="text-align: right;"><u>20</u></td> <td></td> </tr> <tr> <td style="text-align: right;">60</td> <td></td> </tr> <tr> <td style="text-align: right;"><u>15</u></td> <td></td> </tr> <tr> <td style="text-align: right;">75</td> <td></td> </tr> <tr> <td style="text-align: right;"><u>100</u></td> <td></td> </tr> <tr> <td colspan="2" style="text-align: right;">7500 lb., Ans.</td> </tr> </tbody> </table> | tons. | cwt. | 3 | 15 | <u>20</u> | | 60 | | <u>15</u> | | 75 | | <u>100</u> | | 7500 lb., Ans. | | <p>(4.)</p> <table border="0"> <thead> <tr> <th style="text-align: right;">miles.</th> </tr> </thead> <tbody> <tr> <td style="text-align: right;">9</td> </tr> <tr> <td style="text-align: right;"><u>8</u></td> </tr> <tr> <td style="text-align: right;">72</td> </tr> <tr> <td style="text-align: right;"><u>40</u></td> </tr> <tr> <td style="text-align: right;">2880 rd., Ans.</td> </tr> </tbody> </table> | miles. | 9 | <u>8</u> | 72 | <u>40</u> | 2880 rd., Ans. | | | | | | | | | | | | | | | | |
|--|--|------|---------|-----|-----------|------------|----|------|-----------|------------|----|-------|------------|------------|----------------|---------------------|---|--------|-----------------|----------|---|-----------|----------------|-----|----|---|---|----------|--|--|-----|--|--|----------|--|--|-----------------|--|--|
| tons. | cwt. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>20</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>15</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>100</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7500 lb., Ans. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| miles. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>8</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>40</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2880 rd., Ans. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>(3.)</p> <table border="0"> <thead> <tr> <th style="text-align: right;">lb.</th> <th style="text-align: right;">oz.</th> </tr> </thead> <tbody> <tr> <td style="text-align: right;">2</td> <td style="text-align: right;">8</td> </tr> <tr> <td style="text-align: right;"><u>16</u></td> <td></td> </tr> <tr> <td style="text-align: right;">32</td> <td></td> </tr> <tr> <td style="text-align: right;"><u>8</u></td> <td></td> </tr> <tr> <td style="text-align: right;">40</td> <td></td> </tr> <tr> <td style="text-align: right;"><u>16</u></td> <td></td> </tr> <tr> <td style="text-align: right;">240</td> <td></td> </tr> <tr> <td style="text-align: right;"><u>40</u></td> <td></td> </tr> <tr> <td colspan="2" style="text-align: right;">640 drams, Ans.</td> </tr> </tbody> </table> | lb. | oz. | 2 | 8 | <u>16</u> | | 32 | | <u>8</u> | | 40 | | <u>16</u> | | 240 | | <u>40</u> | | 640 drams, Ans. | | <p>(5.)</p> <table border="0"> <thead> <tr> <th style="text-align: right;">gal.</th> <th style="text-align: right;">qt.</th> <th style="text-align: right;">pt.</th> </tr> </thead> <tbody> <tr> <td style="text-align: right;">98</td> <td style="text-align: right;">0</td> <td style="text-align: right;">1</td> </tr> <tr> <td style="text-align: right;"><u>4</u></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">392</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;"><u>2</u></td> <td></td> <td></td> </tr> <tr> <td colspan="3" style="text-align: right;">785 pints, Ans.</td> </tr> </tbody> </table> | gal. | qt. | pt. | 98 | 0 | 1 | <u>4</u> | | | 392 | | | <u>2</u> | | | 785 pints, Ans. | | |
| lb. | oz. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>16</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>8</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>16</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 240 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>40</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 640 drams, Ans. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| gal. | qt. | pt. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>4</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 392 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>2</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 785 pints, Ans. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <p>(6.)</p> <table border="0"> <thead> <tr> <th style="text-align: right;">A.</th> <th style="text-align: right;">sq. rd.</th> </tr> </thead> <tbody> <tr> <td style="text-align: right;">583</td> <td style="text-align: right;">130</td> </tr> <tr> <td style="text-align: right;"><u>160</u></td> <td></td> </tr> <tr> <td style="text-align: right;">3498</td> <td></td> </tr> <tr> <td style="text-align: right;"><u>583</u></td> <td></td> </tr> <tr> <td style="text-align: right;">93280</td> <td></td> </tr> <tr> <td style="text-align: right;"><u>130</u></td> <td></td> </tr> <tr> <td colspan="2" style="text-align: right;">93410 sq. rd., Ans.</td> </tr> </tbody> </table> | A. | sq. rd. | 583 | 130 | <u>160</u> | | 3498 | | <u>583</u> | | 93280 | | <u>130</u> | | 93410 sq. rd., Ans. | | | | | | | | | | | | | | | | | | | | | | | |
| A. | sq. rd. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 583 | 130 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>160</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3498 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>583</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93280 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>130</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93410 sq. rd., Ans. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

$$\begin{array}{r}
 \text{(7.)} \quad \text{cords.} \\
 17 \\
 \hline
 128 \\
 136 \\
 34 \\
 17 \\
 \hline
 2176 \\
 1728 \\
 \hline
 17408 \\
 4352 \\
 15232 \\
 2176 \\
 \hline
 3760128 \text{ cu. in., Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(8.)} \quad \text{bu.} \quad \text{pk.} \\
 27 \quad 3 \\
 4 \\
 \hline
 108 \\
 3 \\
 \hline
 111 \\
 8 \\
 \hline
 888 \\
 2 \\
 \hline
 1776 \text{ pints, Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(9.)} \quad 5^\circ \ 6' \ 15'' \\
 60 \\
 \hline
 300 \\
 6 \\
 \hline
 306 \\
 60 \\
 \hline
 18360 \\
 15 \\
 \hline
 18375', \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(10.)} \quad \text{fur.} \quad \text{rd.} \quad \text{yd.} \quad \text{ft.} \\
 5 \quad 12 \quad 4 \quad 0 \\
 40 \\
 \hline
 200 \\
 12 \\
 \hline
 212 \\
 5\frac{1}{2} \\
 \hline
 1060 \\
 106 \\
 \hline
 1166 \\
 4 \\
 \hline
 1170 \\
 3 \\
 \hline
 3510 \text{ ft., Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(11.)} \quad \text{d.} \quad \text{h.} \quad \text{m.} \quad \text{sec.} \\
 365 \quad 5 \quad 48 \quad 50 \\
 24 \\
 \hline
 1465 \\
 730 \\
 \hline
 8765 \\
 60 \\
 \hline
 525948 \\
 60 \\
 \hline
 31556930 \text{ sec., Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(12.)} \quad \text{hhd.} \quad \text{gal.} \quad \text{qt.} \quad \text{pt.} \\
 24 \quad 18 \quad 2 \quad 0 \\
 63 \\
 \hline
 72 \\
 144 \\
 18 \\
 \hline
 1530 \\
 4 \\
 \hline
 6122 \\
 2 \\
 \hline
 12244 \text{ pt., Ans.}
 \end{array}$$

| | m. | fur. | rd. | yd. | ft. | in. | | cwt. | lb. | oz. | dr. |
|-------|-------------------|------|-----|-----|-----|-----|-------|------------------|-----|-----|-----|
| (13.) | 17 | 6 | 22 | 4 | 2 | 7 | (15.) | 4 | 99 | 10 | 12 |
| | 8 | | | | | | | 100 | | | |
| | 142 | | | | | | | 499 | | | |
| | 40 | | | | | | | 16 | | | |
| | 5702 | | | | | | | 2994 | | | |
| | 5½ | | | | | | | 499 | | | |
| | 28510 | | | | | | | 7984 | | | |
| | 2851 | | | | | | | 10 | | | |
| | 31361 | | | | | | | 7994 | | | |
| | 4 | | | | | | | 16 | | | |
| | 31365 | | | | | | | 47964 | | | |
| | 3 | | | | | | | 7994 | | | |
| | 94097 | | | | | | | 12 | | | |
| | 12 | | | | | | | 127916 dr., Ans. | | | |
| | 188194 | | | | | | | | | | |
| | 94097 | | | | | | | | | | |
| | 1129164 | | | | | | (16.) | 180° | | | |
| | 7 | | | | | | | 60 | | | |
| | 1129171 in., Ans. | | | | | | | 10800 | | | |
| | | | | | | | | 60 | | | |
| | | | | | | | | 648000 sec., Ans | | | |
| | bu. | pk. | qt. | | | | | | | | |
| (14.) | 75 | 3 | 5 | | | | | | | | |
| | 4 | | | | | | | | | | |
| | 303 | | | | | | | | | | |
| | 8 | | | | | | | | | | |
| | 2429 qt., Ans. | | | | | | | | | | |

(ART. 246, pp. 163, 164.)

- (18.) $\frac{7}{16} \times 160 = 70$ sq. rd., Ans.
 (19.) $\frac{3}{8} \times 4 = 1\frac{1}{2}$ quarters, Ans.
 (20.) $9\frac{2}{3} = \frac{29}{3}$; $\frac{29}{3} \times \frac{24}{1} \times \frac{60}{1} = 13920$ minutes, Ans.
 (21.) $\frac{7}{1920} \times 12 \times 20 = \frac{7}{8}$ pwt., Ans.

- (22.) - $3\frac{3}{5} \times 1\frac{2}{3} = \frac{6}{7}$ lb., Ans.
- (24.) $.0003 \times 7 = .0021$ days,
 $.0021 \times 24 = .0504$ hours,
 $.0504 \times 60 = 3.024$ minutes, Ans.
- (25.) $6.35 \times 8 = 50.8$ fur.
 $50.8 \times 40 = 2032$ rd.
 $2032 \times 5\frac{1}{2} = 11176$ yd.
 $11176 \times 3 = 33528$ ft., Ans.
- (26.) $.1756 \times 1000 = 175.6$ meters, Ans.
- (27.) $.0015 \times 63 = .0945$ gal.
 $.0945 \times 4 = .378$ pt., Ans.
- (28.) $\$15.69 \times 100 = 1569$ cts.
 $1569 \times 10 = 15690$ mills, Ans.
- (29.) $3.675 \times 1000 = 3675$ kilograms, Ans.
- (30.) $.94375 \times 160 = 151$ sq. rd., Ans.

(ART. 247, pp. 165, 166.)

- | | |
|---|--|
| <p>(2.) $1 00)75 00$ $2,0\overline{)75}$ cwt. 3, 15 cwt. remain- [ing. 3 tons 15 cwt., Ans.</p> | <p>(5.) $2 785$ $4\overline{)392}$, 1 pt. 98 98 gals. 0 qt. 1 pt., Ans.</p> |
| <p>3.) $16 640$ drams, $16\overline{)40}$ 2, 8 oz. 2 lb. 8 oz., Ans.</p> | <p>(6.) $16 0)9341 0(583 \text{ A.}$ 80 134 128 61 48 130 sq. rd. 583 acres, 130 sq. rd., Ans.</p> |
| <p>(4.) $4 0)288 0$ $8\overline{)72}$ 9 miles, Ans.</p> | |

(7.) $3760128 \div 1728 = 2176$ ft.
 $2176 \div 128 = 17$ cords, Ans.

(8.) $1776 \div 2 = 888$ qt.
 $888 \div 8 = 111$ pk.
 $111 \div 4 = 27$ bu. 3 pk., Ans.

(9.) $18375 \div 60 = 306' 15''$
 $306 \div 60 = 5^\circ 6'$
 $5^\circ 6' 15'',$ Ans.

(11.) $6 \overline{)03155693} 0$
 $6, 0 \overline{)52594} 8, 50$ sec.
 $24 \overline{)8765}, 48$ min.
 $365, 5$ h.
 365 d. 5 h. 48 min. 50 sec., Ans.

(12.) $2 \overline{)12244}$
 $4 \overline{)6122}$
 $63 \overline{)1530}, 2$ qt.
 $24, 18$ gal.
 24 hhds. 18 gal. 2 qt., Ans.

(13.) $12 \overline{)1129171}$
 $3 \overline{)94097}, 7$ in.
 $5 \frac{1}{2} \overline{)31365}, 2$ ft.
 $2 \overline{) \quad \quad} 2$
 $11 \overline{)62730}$
 $4 \overline{)0570} 2, \frac{2}{3} = 4$ yd.
 $8 \overline{)142}, 22$ rd.
 $17, 6$ fur.
 17 m. 6 fur. 22 rd. 4 yd. 2 ft.
 7 in., Ans

(14.) $8 \overline{)2429}$
 $4 \overline{)303}, 5$ qt.
 75 bush. 3 pk. 5 qt., Ans.

(15.) $127916 \div 16 = 7994$ and 12 dr. rem.
 $7994 \div 16 = 499$ and 10 oz. rem.
 $499 \div 100 = 4$ and 99 lb. rem.
 4 cwt. 99 lb. 10 oz. 12 dr., Ans.

(16.) $648000 \div 60 = 10800$
 $10800 \div 60 = 180$ deg., Ans.

(18.) $70 \div 160 = \frac{7^0}{160} = \frac{7}{16}$ acre, Ans.

- (19.) $1\frac{1}{2} = \frac{3}{2} \div 4 = \frac{3}{8}$ yd., Ans.
- (20.) $13920 \div 60 = 232$ hours.
 $232 \div 24 = 9$ days, 16 hours.
 9 days, 16 hours = $9\frac{2}{3}$ days, Ans.
- (21.) $\frac{7}{8} \div 20 = \frac{7}{160}$
 $\frac{7}{160} \div 12 = \frac{7}{1920}$ lb., Ans.
- (22.) $\frac{7}{8} \div 100 = \frac{7}{800} = \frac{3}{320}$, Ans.
- (24.) $3.024 \div 60 = .0504$ hours,
 $.0504 \div 24 = .0021$ days,
 $.0021 \div 7 = .0003$ weeks, Ans.
- (25.) $33528 \div 3 = 11176$ yd.
 $11176 \div 5\frac{1}{2} = 2032$ rd.
 $2032 \div 40 = 50.8$ fur.
 $50.8 \div 8 = 6.35$ miles, Ans.
- (26.) $175.6 \div .1756$ kilos., Ans.
- (27.) $.378 \div 4 = .0945$ qt.
 $.0945 \div 63 = .0015$ hhd., Ans.
- (28.) $15690 \div 10 = 1569$ cts.
 $1569 \div 100 = \$15.69$, Ans.
- (29.) $3675 \div 1000 = 3.675$ tons, Ans.
- (30.) $151 \div 160 = \frac{151}{160}$, reduced to a decimal
 = .94375 sq. acre, Ans.

(ART. 248, p. 167.)

- | (2.) | (3.) |
|---|--|
| $\frac{3}{8} \times 40 = 15 = 35\frac{5}{8}$ rd. | $\frac{1}{8} \times 63 = \frac{63}{8} = 7\frac{7}{8}$ gal. |
| $\frac{5}{8} \times \frac{1}{2} = \frac{5}{16} = 3\frac{1}{16}$ yd. | $2\frac{1}{2} \times 4 = 2\frac{1}{2} = 2\frac{1}{2}$ qt. |
| $\frac{1}{8} \times \frac{3}{4} = 0\frac{3}{8}$ ft. | $\frac{3}{8} \times 2 = \frac{3}{4} = 1\frac{1}{4}$ pt. |
| $\frac{1}{4} \times 12 = 2$ in. | $\frac{1}{4} \times 4 = 1$ gill. |
| 35 rd. 3 yd. 0 ft. 2 in., Ans. | 2 qt. 1 pt. 1 gill, Ans. |

(4.)

$$\frac{19}{8} \times 7 = \frac{133}{8} = 3\frac{1}{8} \text{ days}$$

$$\frac{1}{8} \times 24 = 3 \text{ hours}$$

3 days, 4 hours, Ans.

(5.)

$$\frac{5}{4} \times 60 = \frac{300}{4} = 21\frac{3}{4}'$$

$$\frac{3}{4} \times 60 = \frac{180}{4} = 25\frac{3}{4}''$$

21', 25\frac{3}{4}'', Ans.

(6.)

$$\frac{11}{24} \times 4 = \frac{11}{6} = 2\frac{1}{3} \text{ qr.}$$

$$\frac{5}{8} \times 25 = \frac{125}{8} = 20\frac{5}{8} \text{ lb.}$$

$$\frac{5}{8} \times 16 = \frac{80}{8} = 10 \text{ oz.}$$

$$\frac{1}{3} \times 16 = \frac{16}{3} = 5\frac{1}{3} \text{ dr.}$$

$$2 \text{ qr. } 20 \text{ lb. } 13 \text{ oz. } 5\frac{1}{3} \text{ dr., Ans.}$$

(8.)

$$.875 \times 63 = 55.125 \text{ gal.}$$

$$.125 \times 4 = .5 \text{ qt.}$$

$$.5 \times 2 = 1 \text{ pt.}$$

55 gal. 0 qt. 1 pt., Ans.

(9.)

$$.4765625 \times 8 = 3.8125 \text{ fur.}$$

$$.8125 \times 40 = 32.5 \text{ rd.}$$

$$.5 \times 16\frac{1}{2} = 8.25 \text{ ft.}$$

$$.25 \times 12 = 3 \text{ in.}$$

3 fur. 32 rd. 8 ft. 3 in., Ans

(10.)

$$.09375 \times 160 = 15 \text{ sq. rd.,}$$

[Ans.

(11.)

$$.141 \times 20 = 2.82 \text{ cwt.}$$

$$.82 \times 4 = 3.28 \text{ qr.}$$

$$.28 \times 25 = 7 \text{ lb.}$$

$$5 \text{ tons, } 2 \text{ cwt. } 3 \text{ qr. } 7 \text{ lb., Ans.}$$

(12.)

$$.761 \times 24 = 18.264 \text{ h.}$$

$$.264 \times 60 = 15.84 \text{ min.}$$

$$.84 \times 60 = 50.4 \text{ sec.}$$

18 h. 15 min. 50.4 sec., Ans.

(ART. 249, pp. 168, 169.)

$$(2.) \quad 2 \text{ in. } \frac{2}{32} = \frac{1}{16} \text{ of a yard}$$

5

$$3\frac{1}{8} = \frac{25}{8} \div 5\frac{1}{2} = \frac{55 \times 2}{18 \times 11} = \frac{5}{9} \text{ rd.}$$

9

$$35\frac{5}{9} = \frac{320}{9} \div 40 = \frac{8}{9} \text{ fur., Ans.}$$

$$(3.) \quad 1 \text{ gill} = \frac{1}{4} \text{ pt.}$$

$$1\frac{1}{4} \text{ pt.} = \frac{5}{4}; \frac{5}{4} \div 2 = \frac{5}{8} \text{ qt.}$$

$$2\frac{5}{8} \text{ qt.} = \frac{21}{8}; \frac{21}{8} \div 4 = \frac{21}{32} \text{ gal.}$$

$$\frac{21}{32} \div 63 = \frac{1}{96} \text{ hhd., Ans.}$$

- (4.) $4 \text{ h.} = \frac{4}{24} = \frac{1}{6} \text{ day,}$
 $3\frac{1}{8} = \frac{19}{8}; \frac{19}{8} \div 7 = \frac{19}{56} \text{ week, Ans.}$
- (5.) $25\frac{5}{7} = \frac{25\frac{5}{7}}{60} = \frac{180}{420} = \frac{3}{7} \text{ minute,}$
 $21\frac{3}{7} = \frac{150}{7}; \frac{150}{7} \div 60 = \frac{150}{420} = \frac{5}{14} \text{ degree, Ans.}$
- (6.) $5\frac{1}{2} \text{ dr.} = \frac{5\frac{1}{2}}{60} = \frac{1}{3} \text{ oz.}$
 $13\frac{1}{2} \text{ oz.} = \frac{43}{2}; \frac{43}{2} \div 16 = \frac{5}{8} \text{ lb.}$
 $20\frac{5}{8} \text{ lb.} = \frac{125}{8}; \frac{125}{8} \div 25 = \frac{5}{8} \text{ qr.}$
 $2\frac{5}{8} \text{ qr.} = \frac{17}{8}; \frac{17}{8} \div 4 = \frac{17}{32} \text{ cwt., Ans.}$
- (8.) $1 \text{ pt.} \div 2 = .5 \text{ qt.}$
 $.5 \text{ qt.} \div 4 = .125 \text{ gal.}$
 $55.125 \div 63 = .875 \text{ hhd., Ans.}$
- (9.) $3 \div 12 = .25 \text{ ft.}$
 $8.25 \div 16\frac{1}{2} = .5 \text{ rd.}$
 $32.5 \div 40 = .8125 \text{ fur.}$
 $3.8125 \div 8 = .4765625 \text{ mile, Ans.}$
- (10.) $15 \div 160 = .09375 \text{ acre, Ans.}$
- (11.) $7 \div 25 = .28 \text{ qr.}$
 $3.28 \div 4 = .82 \text{ cwt.}$
 $2.82 \div 20 = .141 \text{ ton,}$
 5.141 tons, Ans.
- (12.) $50.4 \div 60 = .84 \text{ minute,}$
 $15.84 \div 60 = .264 \text{ hour,}$
 $18.264 \div 24 = .761 \text{ day, Ans.}$
- (13.) $1 \text{ lb. } 4 \text{ oz. } 12 \text{ pwt. } 12 \text{ gr.} = 7980 \text{ grains,}$
 $2 \text{ oz. } 15 \text{ pwt. } 10 \text{ gr.} = 1330 \text{ grains,}$
 $1330 \div 7980 = \frac{133}{798} = \frac{1}{6}, \text{ Ans.}$
- (14.) $7 \text{ bu. } 1 \text{ pk.} = 464 \text{ pt.}$
 $2 \text{ qt. } 1 \text{ pt.} = 5 \text{ pt.}$
 $5 \div 464 = \frac{5}{464}, \text{ Ans.}$

- (15.) 3 acres = 480 rd.
 1 A. 26 rd. = 186 rd.
 $186 \div 480 = \frac{186}{480} = \frac{31}{80}$, Ans.
- (16.) 1 T. 6 cwt. 15 lb. 10 oz. = 41850 oz.
 10 cwt. 46 lb. 4 oz. = 16736 oz.
 $16736 \div 41850 = \frac{16736}{41850} = \frac{2}{5}$, Ans.
- (17.) 148 m. 4 fur. = 47520 rd.
 18 m. 4 fur. 20 rd. = 5940 rd.
 $5940 \div 47520 = .125$, Ans.
- (18.) 7 weeks, 4 days = 76320 min.
 2 days, 17 min. = 2897 min.
 $2897 \div 76320 = .0379585$ +, Ans.
- (19.) 45 tons, 15 cwt. 25 lb. = 91525 lb.
 6 tons, 10 cwt. 75 lb. = 13075 lb.
 $13075 \div 91525 = .142857$, Ans.

APPLICATIONS.

(PAGES 169-171.)

- (1.)
- | lb. | oz. | pwt. |
|----------------|-----|------|
| 2 | 3 | 6 |
| <hr/> | | |
| 12 | | |
| <hr/> | | |
| 27 | | |
| <hr/> | | |
| 20 | | |
| <hr/> | | |
| 546 pwt., Ans. | | |
- (2.) 3 cwt. 63 lb. = 363 lb.
 $363 \times .05 = \$18.15$, Ans.
- (3.) $80 \times 65 = 5200$ sq. rd.
 $5200 \div 160 = 32$ A. 80 P., Ans.

- (4.) $63 \text{ ga.} = 504 \text{ pt.}$
 $1 \text{ qt. } 1 \text{ pt.} = 3 \text{ pt.};$
 $504 \div 3 = 168 \text{ bottles, Ans.}$
- (5.) $100.14 \times 12.45 \times 10 = 12467.43 \text{ sq. ft.};$
 $12467.43 \times .27 = 461.756 + \text{cu. yd.};$
 $461.756 \times .20 = \$92.351 +, \text{Ans.}$
- (6.) $45 \text{ min.} = \frac{3}{4} \text{ hour};$
 $300 \times 40 \times \frac{3}{4} = 9000 \text{ hours};$
 $9000 \times .15 = \$1350, \text{Ans.}$
- (7.) $788436 \div 272\frac{1}{4} = 2896 \text{ sq. rd.};$
 $2896 \times \frac{8}{5} = \$1810, \text{Ans.}$
- (8.) $353.79 \div .03 = 11793 \text{ lb.};$
 $11793 \text{ lb.} = 5 \text{ tons } 17 \text{ cwt. } 3 \text{ qr. } 18 \text{ lb., Ans.}$
- (9.) $100 \times 4 \times 12 = 4800 \text{ solid ft.};$
 $4800 \div 128 = 37\frac{1}{2} \text{ cords};$
 $37\frac{1}{2} \times 5 = \$187.50, \text{Ans.}$
- (10.) 1868 and 1872, Ans.
- (11.) $24 \text{ ft.} = 8 \text{ yd.}; 18 \text{ ft.} = 6 \text{ yd.};$
 $8 \times 6 = 48 \text{ sq. yd., Ans.}$
- (12.) $2 \text{ qr. } 20 \text{ lb.} = 50 \text{ lb.} + 20 \text{ lb.} = 70 \text{ lb.};$
 $2 \text{ T. } 5 \text{ cwt.} = 40 \text{ cwt.} + 5 \text{ cwt.} = 45 \text{ cwt.};$
 $45 \text{ cwt.} + 70 \text{ lb.} = 45.70 \text{ cwt.};$
 $\$9 \times 45.70 = \$411.30, \text{Ans.}$
- (13.) $16 \text{ years of } 365\frac{1}{4} \text{ days} = 5865 \text{ days};$
 $3 \text{ weeks of } 7 \text{ days} = 21 \text{ days};$
 $5886 \times 24 = 140760 \text{ hours};$
 $140760 \text{ hours} + 18 \text{ hours} = 140778 \text{ hours};$
 $140778 \times 60 = 8446680 \text{ minutes};$
 $8446680 + 30 = 8446710 \text{ minutes, Ans.}$

- (14.) $264.25 \div 3.50 = 75.5$ gallons;
 $= 1$ hhd. 12 gal. 2 qt., Ans.
- (15.) $229.05 \div 9 = 25.45$ cwt. =
 1 T. 5 cwt. 1 qr. 20 lb., Ans.
- (16.) March has 31 days = 44640 minutes;
 February has 29 days = 41760 minutes;
 $44640 - 41760 = 2880$ minutes, Ans.
- (17.) $.62137 \times 31.5 = 19.573155$ miles;
 $.573155 \times 8 = 4.585240$ fur. ;
 $.58524 \times 40 = 23.4096$ rd. ;
 $.4096 \times 16\frac{1}{2} = 6.7584$ ft. ;
 Ans. 19 m. 4 fur. 23 rd. 6.7584 ft.
- (18.) $8 \times 4 \times 6\frac{1}{2} = 208$ cu. ft. ;
 $208 \div 128 = 1$ C. 80 cu. ft. ;
 $80 \div 16 = 5$ cu. ft. ;
 1 C. 5 cu. ft., Ans.
- (19.) $.9628 \times 365 = 351.422$ days ;
 $.422 \times 24 = 10.128$ hours ;
 $.128 \times 60 = 7.68$ minutes ;
 $.68 \times 60 = 40.8$ seconds ;
 351 d. 10 h. 7 m. 40.8 sec., Ans.
- (20.) $80.5 \times .3524 = 28.3682$ hectoliters, Ans.
- (21.) 1 lb. av. = 7000 Troy grains ;
 $7000 \div 15 = 466\frac{2}{3}$ doses ; $466\frac{2}{3} \times .20 = \$93.33\frac{1}{3}$, An
- (22.) $.695 \times 2000 = 1390$ lb. ;
 $1390 \times .08 = \$111.20$, Ans.
- (23.) 4 d. 3 h. = 99 hours ;
 2 w. $6\frac{1}{4}$ d. = 486 hours ;
 $486 \div 99 = 4.909\frac{1}{9}$, Ans.

- (24.) $69.5 - 69.16 = .34$ mile;
 $.34 \times 360 = 122.4$ miles;
 $.4$ m. 3 fur. 8 rd.; 122 m. 3 fur. 8 rd., **Ans.**
- (25.) $40' 30'' = 2430''$;
 $60^\circ 45' = 218700''$;
 $218700 \div 2430 = 90$ minutes $= 1$ h. 30 m., **Ans.**
- (26.) $112 \times 25 \times 2 = 5600$ sq. ft.;
 $5600 \times 6 = 33600$ shingles, **Ans.**

(ART. 251, pp. 171-173.)

- (6.) 1227 cu. yd. 1 cu. ft. 524 cu. in., **Ans.**
- (8.) 124 bu. 3 pk. 0 qt. 1 pt., **Ans.**

(ART. 252, pp. 173, 174.)

- (4.) $\frac{3}{4}$ mile $= 6$ furlongs;
 $\frac{7}{10}$ fur. $= 28$ rds.;
 6 fur. 28 rd., **Ans.**
- (15.) $\begin{array}{r} \text{A.} \quad \text{P.} \\ .6 \text{ acres} = \quad 96 \\ .85 \text{ acres} = \quad 136 \\ \hline 17 \quad 32 \\ 18 \quad 104, \text{ Ans.} \end{array}$
- (16.) $\begin{array}{r} \text{d.} \quad \text{h.} \quad \text{m.} \quad \text{sec.} \\ \frac{1}{2} \text{ week} = 2 \quad 8 \quad 0 \quad 0 \\ \frac{9}{13} \text{ day} = 0 \quad 16 \quad 36 \quad 55\frac{5}{13} \\ \frac{1}{2} \text{ hour} = 0 \quad 0 \quad 30 \quad 0 \\ \hline \text{Ans.} \quad 3 \quad 1 \quad 6 \quad 55\frac{5}{13} \end{array}$

(PAGES 174, 175.)

- (1.) $\begin{array}{r} \text{T.} \quad \text{cwt.} \quad \text{qr.} \quad \text{lb.} \\ 1 \quad 14 \quad 1 \quad 17 \\ 1 \quad 0 \quad 2 \quad 17 \\ 1 \quad 0 \quad 2 \quad 10 \\ \hline 3 \quad 15 \quad 2 \quad 19, \text{ Ans.} \end{array}$
- (2.) $\begin{array}{r} \text{lb.} \quad \text{oz.} \quad \text{pwt.} \quad \text{gr.} \\ 11 \quad 4 \quad 16 \quad 11 \\ 2 \quad 5 \quad 6 \quad 14 \\ 6 \quad 7 \quad 14 \quad 17 \\ \hline 20 \quad 5 \quad 17 \quad 18, \text{ Ans.} \end{array}$

(3.)

| | rd. | yd. | ft. | in. |
|-------------------------|-----|-----|-----|---------|
| | 0 | 2 | 2 | 7 |
| $\frac{2}{5}$ of mile = | 34 | 5 | 0 | 0 |
| $\frac{3}{4}$ of fur. = | 1 | 2 | 0 | 0 |
| | 3 | 1 | 11 | |
| | 37 | 2 | 1 | 6, Ans. |

(4.)

| c. | cu. ft. | cu. in. |
|-----|---------|-----------|
| 50 | 104 | 172 |
| 30 | 110 | 100 |
| 45 | 48 | 0 |
| 9 | 56 | 678 |
| 136 | 62 | 950, Ans. |

(5.)

| | | |
|------|-----|--------|
| Jan. | 31 | days, |
| Feb. | 28 | " |
| Mar. | 31 | " |
| Apr. | 30 | " |
| May | 16 | " |
| | 136 | " Ans. |

(6.)

| ° | ' | " |
|----|----|---------|
| 4 | 45 | 0 |
| 3 | 0 | 45 |
| 2 | 25 | 5 |
| 3 | 10 | 15 |
| 13 | 21 | 5, Ans. |

(7.)

| ° | ' | " |
|----|----|----------|
| 39 | 58 | 24 |
| 32 | 24 | 3 |
| 72 | 22 | 27, Ans. |

(8.)

| | A. | P. |
|--------------------------|----|----------|
| 5.88125 acres = | 5 | 141 |
| 19 $\frac{1}{2}$ acres = | 19 | 100 |
| | 41 | 17 |
| | 66 | 98, Ans. |

(ART. 253, p. 176.)

(5.)

| hhd. | gal. | qt. | pt. | gl. |
|------|------|-----|---------|-----|
| 1 | 2 | 1 | 0 | 3 |
| | 13 | 3 | 1 | 0 |
| 51 | 1 | 1 | 8, Ans. | |

(7.)

| d. | h. | m. |
|-----|----|----------|
| 365 | 0 | 0 |
| 310 | 5 | 45 |
| 54 | 18 | 15, Ans. |

(ART. 254, p. 176.)

| (10.) | | | | (11.) | | | |
|--------------------------|-----|-----|------------------------|----------------------------|-----|-----|-----|
| | lb. | oz. | dr. | | P. | ft. | in. |
| $\frac{2}{3}$ of a gr. = | 16 | 10 | $10\frac{2}{3}$ | $\frac{2}{3}$ of an acre = | 106 | 181 | 72 |
| $\frac{5}{8}$ of a lb. = | | 8 | $14\frac{2}{3}$ | $\frac{7}{8}$ of an acre = | 70 | | |
| | 16 | 1 | $12\frac{2}{3}$, Ans. | Ans. | 36 | 181 | 72 |

(12.) $\frac{1}{4}$ of a sq. yd. = $\frac{1}{4}$ of 1296 sq. in. = 324 sq. in.
 $\frac{1}{8}$ of a yard = 6×6 sq. in. = 36 sq. in.
 Ans. 288 sq. in.

(13.) .37 of a degree = 22' 12"
 $\frac{5}{14}$ of a degree = $21 \ 25\frac{1}{2}$
 46 $\frac{2}{7}$ ", Ans.

(ART. 255, p. 177.)

| (15.) | | | | (17.) | | | |
|-------|----|----------|--|-------|----|----------|--|
| y. | m. | d. | | y. | m. | d. | |
| 1866 | 8 | 5 | | 1865 | 3 | 3 | |
| 1807 | 1 | 14 | | 1492 | 9 | 14 | |
| 59 | 6 | 22, Ans. | | 372 | 5 | 22, Ans. | |

| (16.) | | | | (18.) | | | |
|-------|----|----|----------|-------|----|----------|--|
| y. | m. | d. | h. | y. | m. | d. | |
| 1865 | 0 | 8 | 6 | 1861 | 3 | 14 | |
| 1776 | 6 | 4 | 13 | 1783 | 0 | 20 | |
| 88 | 6 | 3 | 17, Ans. | 78 | 2 | 24, Ans. | |

(PAGES 177, 178.)

| (1.) | | | | (2.) | |
|------|------|-----|---------|------|----------|
| T. | cwt. | qr. | lb. | C. | cu. ft. |
| 20 | 0 | 2 | 14 | 7 | 0 |
| 10 | 13 | 2 | 14 | 2 | 78 |
| 9 | 7 | 0 | 0, Ans. | 4 | 50, Ans. |

| (3.) | | | (4.) | | |
|------|------|----------|------|----|----------|
| m. | fur. | rd. | ° | ' | " |
| 98 | 5 | 3 | 122 | 26 | 48 |
| 12 | 6 | 4* | 71 | 3 | 30 |
| 85 | 6 | 39, Ans. | 51 | 23 | 18, Ans. |

(5.)

| | | |
|----|----|----------|
| ° | ' | " |
| 42 | 0 | 0 |
| 29 | 57 | 30 |
| 12 | 2 | 30, Ans. |

(7.) $29 - 22 = 7$ days in Feb.
 Feb. Mar. Apr. May. June. July.
 $7 + 31 + 30 + 31 + 30 + 4 = 133$, Ans.

(8.) $1880 - 1820 = 60 \div 4 = 15$, Ans.

(10.)

| | | | |
|--------------------|---------|-----|-----|
| bu. | bu. | pk. | qt. |
| $325\frac{15}{16}$ | $= 325$ | 3 | 6 |
| $43\frac{3}{8}$ | $= 43$ | 2 | 4 |
| | 587 | 3 | 7 |
| | 957 | 2 | 1 |

| | | | | | | |
|-----|-----|-----|--|-----|-----|---------|
| bu. | pk. | qt. | | bu. | pk. | qt. |
| 367 | 2 | 4 | | | | |
| 56 | 2 | 3 | | 957 | 2 | 1 |
| 35 | 3 | 2 | | 758 | 0 | 1 |
| 298 | | | | 199 | 2 | 0, Ans. |
| 758 | 0 | 1 | | | | |

(ART. 256, p. 179.)

(5.) 221 d. 10 h. 53 m. 36 sec., Ans.

(PAGE 180.)

(2.) 1 lb. 7 oz. 14 pwt., Ans.

(5.) 46 yd. $1\frac{1}{2}$ qr., Ans.

* $\frac{1}{16}$ of a furlong $= 4$ rd.

(ART. 257, p. 181.)

(4.) $1 \text{ cwt. } 0 \text{ qr. } 9 \text{ lb. } 2 \text{ oz. } 10\frac{1}{2} \text{ dr., Ans.}$

(6.) $2 \text{ lb. } 7 \text{ oz. } 9 \text{ pwt. } 22 \text{ gr., Ans.}$

(8.) $111 \text{ C. } 7 \text{ c. ft. } 7 \text{ cu. ft., Ans.}$

(ART. 258, p. 182.)

(10.) $5 \text{ pwt. } 9 \text{ gr.} = 129 \text{ gr.}; 9 \text{ lb. } 9 \text{ oz. } 3 \text{ pwt. } 12 \text{ gr.} = 56244 \text{ gr.}; 56244 \div 129 = 436, \text{ Ans.}$

(11.) $17 \text{ m. } 5 \text{ fur. } 27 \text{ rd.} = 5667 \text{ rd.}; 513 \text{ m. } 4 \text{ fur. } 23 \text{ rd.} = 164343 \text{ rd.}; 164343 \div 5667 = 29, \text{ Ans.}$

(PAGE 182.)

(2.) $12 \text{ cwt. } 1 \text{ qr. } 23 \text{ lb., Ans.}$

(3.) $7 \text{ lb. } 6 \text{ oz. } 13 \text{ pwt.} \div 24 = 3 \text{ oz. } 15 \text{ pwt. } 13 \text{ gr., Ans.}$

(5.) $4 \text{ bu. } 3 \text{ pk.} = 19 \text{ pk.}; 456 \text{ bu.} = 1824 \text{ pk.}; 1824 \div 19 = 96, \text{ Ans.}$

(7.) $12 \text{ m. } 3 \text{ fur. } 19 \text{ rd.} = 3979 \text{ rd.}; 174 \text{ m. } 0 \text{ fur. } 26 \text{ rd.} = 55706 \text{ rd.}; 55706 \div 3979 = 14, \text{ Ans.}$

LONGITUDE AND TIME.

(ART. 259, p. 183.)

(1.) $15)77^{\circ} \quad 2' \quad 48''$

$$5 \text{ h. } 8 \text{ m. } 11\frac{1}{5} \text{ sec. later at Greenwich}$$
$$= 2 \text{ h. } 8 \text{ m. } 11\frac{1}{5} \text{ sec. P. M., Ans.}$$

| | | | |
|------|----|-----------------|-------------------------------------|
| | m. | sec. | |
| (2.) | 40 | $22\frac{1}{2}$ | $90^{\circ} 15' 10''$ |
| | | 15 | $10 \quad 0 \quad 36$ |
| | 10 | 0 | $80 \quad 14 \quad 34, \text{Ans.}$ |

(3.) $15)48^{\circ} 26' 45''$
 3 h. 13 m. 47 sec. later at N. Y.
 10 o'clock P. M. + 3 h. 13 m. 47 sec. =
 1 h. 13 m. 47 sec. A. M. the day following, or Jan. 1,
 1866, Ans.

| | | | |
|------|----|----|---------------------|
| | h. | m. | sec. |
| (4.) | 2 | 45 | 30 |
| | | | 15 |
| | 41 | 22 | $30'', \text{Ans.}$ |

PRACTICE.

(ART. 261, p. 185.)

| | | |
|------|---------------------------------------|---------------------------------|
| (4.) | 60 acres, cost | \$4800 |
| | 80 rd., or $\frac{1}{2}$ acre, cost | 40 |
| | 40 rd., or $\frac{1}{2}$ 80 rd. | 20 |
| | The whole cost | \$4860, Ans. |
| (5.) | 13 gal. at \$.60 = | \$7.80 |
| | 2 qt. = $\frac{1}{2}$ gal. = | .30 |
| | 1 qt. = $\frac{1}{2}$ of 2 qt. = | .15 |
| | 1 pt. = $\frac{1}{2}$ qt. = | .07 $\frac{1}{2}$ |
| | | \$8.32 $\frac{1}{2}$, Ans |
| (6.) | 10 miles at \$6490 cost | \$64900 |
| | 4 fur. = $\frac{1}{2}$ mile, cost | 3245 |
| | 2 fur. = $\frac{1}{2}$ of 4 fur. cost | 1622.50 |
| | 20 rd. = $\frac{1}{4}$ of 2 fur. | 405.62 $\frac{1}{2}$ |
| | | \$70173.12 $\frac{1}{2}$, Ans. |

| | | |
|------|--|-----------------|
| (7.) | 2117 at 25 cts. or $\frac{1}{4}$ of a \$, cost | \$529.25 |
| | “ “ $12\frac{1}{2}$ cts. or $\frac{1}{8}$ of a \$, “ | <u>264.625</u> |
| | | \$793.875, Ans. |

| | | |
|------|--------------------------|----------------|
| (8.) | 120 yd. at \$1.00 cost | \$120.00 |
| | “ “ “ 2.00 “ | 240.00 |
| | “ “ “ .50 “ | 60.00 |
| | “ “ “ $.16\frac{2}{3}$ “ | <u>20.00</u> |
| | | \$440.00, Ans. |

| | | |
|------|------------------------------|---------------|
| (9.) | 10 bu. at \$.88 cost | \$8.80 |
| | 10 “ “ “ “ | 8.80 |
| | 4 “ “ “ “ | 3.52 |
| | 2 pk. or $\frac{1}{2}$ bu. “ | .44 |
| | 4 qt. or $\frac{1}{2}$ pk. “ | <u>.11</u> |
| | | \$21.67, Ans. |

| | | |
|-------|--|------------------------------------|
| (10.) | 10 d. 8 h. = $10\frac{1}{3}$ days. | |
| | $10\frac{1}{3}$ days at 18 miles per day = | m. fur. rd. |
| | “ “ “ 5 fur. “ “ | 186 0 0 |
| | “ “ “ 16 rd. “ “ | 6 3 $26\frac{2}{3}$ |
| | | <u>4 5$\frac{1}{3}$</u> |
| | | 192 7 $32\frac{2}{3}$, Ans. |

| | | |
|-------|--|-------------------------------------|
| (11.) | 6 m. = $\frac{1}{2}$ year, the rent = $\frac{1}{2}$ of \$240 = | \$120.00 |
| | 2 m. = $\frac{1}{3}$ of 6 mo. “ $\frac{1}{3}$ of \$120 | 40.00 |
| | 1 m. = $\frac{1}{2}$ of 2 mo. “ $\frac{1}{2}$ of \$40 | 20.00 |
| | 15 d. = $\frac{1}{2}$ of 1 mo. “ $\frac{1}{2}$ of \$20 | 10.00 |
| | 5 d. = $\frac{1}{3}$ of 15 d. “ $\frac{1}{3}$ of \$10 | 3.33 $\frac{1}{3}$ |
| | 5 d. = $\frac{1}{3}$ of 15 d. “ $\frac{1}{3}$ of \$10 | <u>3.33$\frac{1}{3}$</u> |
| | Ans. | \$196.66 $\frac{2}{3}$ |

| | | |
|-------|---|---------------|
| (12.) | 108 cu. yd. at \$.42 cost | \$45.36 |
| | 18 cu. ft. = $\frac{2}{3}$ of a cu. yd. cost $\frac{2}{3}$ of \$.42 | <u>.28</u> |
| | | \$45.64, Ans. |

REVIEW EXERCISES.

(PAGES 186, 187.)

- (1.) 1 T. 5 cwt. 56 lb. = 2556 lb.
 2556 lb. at \$.10 = \$255.60
 " " \$.01 = 25.56
 \$281.16, Ans.
- (2.) $281.16 \div 11 = 2556 \text{ lb.} = 1 \text{ T. } 5 \text{ cwt. } 56 \text{ lb., Ans.}$
- (3.) At \$.20 per sq. rd., 160 sq. rd., or 1 acre, cost \$32.
 $\frac{1}{2}$ of 640 acres = 320 acres.
 $320 \times 20 = 6400$
 $320 \times 32 = 10240$
 $10240 - 6400 = 3840$, Ans.
- (4.) $\frac{3}{8} \text{ lb.} = 5120 \text{ grains} \times .02 = \102.40 , Ans.
- (6.) 10 lb. Av. = 70000 grains Troy
 = 12 lb. 1 oz. 16 pwt. 2 gr. = 12.1534+ lb.;
 $\$6.50 \times 12.1534 = \$78.99+$;
 $\$6.50 \times 10 = \65.00 ;
 $\$78.99 - \$65.00 = \$13.99$, Ans.
- (7.) 8 h. 4 m. = 29040 sec.;
 $\frac{5}{8}$ of 29040 sec. = 24200 sec =
 6 h. 43 m. 20 sec., Ans.
- (8.) $\frac{1}{25}$ of 2 tons = 160 lb.;
 160 lb. cost \$1.80; then,
 $100 \text{ lb. cost } \frac{100}{160} = \frac{5}{8} \text{ of } \$1.80 = \$1.12\frac{1}{2}$, Ans.

- (9.) $29.5 \times 11.25 = 331.875$ sq. ft. ;
 $331.875 \div 9 = 36.875$ sq. yd.
 If $\frac{5}{8}$ yd. width cost \$1.50,
 $\frac{3}{8}$, or 1 yd. wide, cost 8 times $\frac{1}{8}$ of \$1.50, or \$2.40 ;
 $36.875 \times 2.40 = \$88.50$, Ans.
- (11.) 1 acre = 160 rd. ;
 $160 \div 42.4 = 3.77+$ rd., Ans.
- (12.) From Apr. 16 to March 31 = $11\frac{1}{2}$ months ; $\$25 \times$
 $11\frac{1}{2} = \$287.50$, Ans.
- (13.) 2 bushels = 4300.84 cu. in. ;
 $4300.84 \div 231 = 18.62$ liquid gal. ;
 15 cts. a qt. = 60 cts. a gal., and
 $18.62 \times .60 = \$11.17+$;
 2 bu. at \$4.80 = \$9.60 ;
 $\$11.17 - \$9.60 = \$1.57$, Ans.
- (15.) 1 hectoliter = 2.837 bushels ;
 $2.837 \times 40 = 113.48$ bu. ;
 1 hectare = 2.471 acres ;
 $113.48 \div 2.471 = 45.9+$ bu., Ans.
- (16.) $132 \times 4 \times 1\frac{1}{2} = 792$ cu. ft. ;
 $792 \div 24.75 = 32$;
 $\$2.25 \times 32 = \72 , Ans.
- (18.) 4 C. 6 c. ft. = 608 cu. ft. ;
 $4 \times 6 = 24$ ft. ;
 $608 \div 24 = 25\frac{1}{3}$ ft., Ans.
- (19.) $30^\circ + 7^\circ 30' = 37^\circ 30'$,
 $37^\circ 30' \div 15 = 2$ h. 30 m. earlier at the former place
 = 10 h. 30 m. P. M. July 3d, Ans.

PERCENTAGE.

(ART. 264, pp. 188, 189.)

| | | | |
|-------|----------------------------------|-------|--------------------|
| (5.) | Ans. .00 $\frac{1}{2}$, or .005 | (16.) | Ans. $\frac{3}{8}$ |
| (6.) | .00 $\frac{1}{4}$ " .0025 | (17.) | $\frac{1}{6}$ |
| (7.) | .00 $\frac{3}{10}$ " .003 | (18.) | 173 $\frac{3}{5}$ |
| (8.) | .07 $\frac{3}{10}$ " .073 | (19.) | $\frac{5}{8}$ |
| (9.) | .45 | (23.) | 16 $\frac{2}{3}$ % |
| (10.) | .90 | (24.) | 3.20 " |
| (11.) | 1.50 | (25.) | 80 " |
| (12.) | 2.75 | (26.) | 590 " |

(PAGE 190.)

- (2.) $43 \times .05\frac{1}{2} = 2.365$ yd., Ans.
- (3.) $100 \% - .87\frac{1}{2} \% = 12\frac{1}{2} \%$, or $\frac{12\frac{1}{2}}{100} = \frac{1}{8}$;
 $\frac{1}{8}$ of \$2250 = \$281.25, Ans.
- (4.) $3160 \times .15\frac{1}{2} = 489.8$;
 $3160 - 489.8 = 2670.2$; $2670.2 \times .05 = 133.51$;
 $2670.2 - 133.51 = 2536.69$ barrels;
 $2536.69 \times 3 = \$7610.07$, Ans.

(ART. 267, p. 191.)

- (3.) $\frac{87}{600} = .09\frac{1}{2} = 9\frac{1}{2} \%$, Ans.
- (5.) $\frac{782.80}{760.00} = 1.03 = 103 \%$, Ans.
- (7.) $\frac{28.47}{657.00} = .04\frac{1}{3} = 4\frac{1}{3} \%$, Ans.
- (11.) 5 cwt. 2 qr. $21\frac{1}{2} = 571\frac{1}{2}$ lb.
12 cwt. 2 qr. 20 lb. = 1270 lb.
 $\frac{571.5}{1270} = .45 = 45 \%$, Ans.

(PAGE 191.)

$$(1.) \quad \frac{20}{4000} = \frac{1}{200} = .005 = \frac{1}{2} \%, \text{ Ans.}$$

$$(2.) \quad \frac{2.365}{43} = .055 = 5\frac{1}{2} \%, \text{ Ans.}$$

$$(4.) \quad 5600 - 4802 = 798 ;$$

$$\frac{798}{5600} = .14\frac{1}{4} = 14\frac{1}{4} \%, \text{ Ans.}$$

$$(5.) \quad 235 - 110 = 125 ;$$

$$\frac{125}{235} = \frac{25}{47} = .53\frac{9}{47} \%, \text{ Ans.}$$

$$(6.) \quad 100 \text{ acres increased by } 50 \% = 150 \text{ acres ;}$$

$$100 \text{ acres decreased by } 50 \% = 50 \text{ acres ;}$$

$$\frac{50}{150} = .33\frac{1}{3} = 33\frac{1}{3} \%, \text{ Ans.}$$

(ART. 268, p. 192.)

$$(3.) \quad 57 \div .09\frac{1}{2} = 600, \text{ Ans.}$$

$$(6.) \quad 235.50 \div .157 = 1500, \text{ Ans.}$$

(ART. 269, p. 192.)

$$10.) \quad \text{If } \$242.14 = \frac{25}{100}, \text{ or } \frac{1}{4} \text{ of a number ;}$$

$$\frac{1}{4}, \text{ or the number, } = 4 ; \$242.14 \times 4 = \$968.56, \text{ Ans.}$$

(PAGE 193.)

$$(1.) \quad 10.08 \div .16 = 63 \text{ gal., Ans.}$$

$$(2.) \quad \$8 \div .004 = \$2000, \text{ Ans.}$$

$$(3.) \quad \frac{37\frac{1}{2}}{100} = \frac{3}{8} ; \text{ if } \$281.25 = \frac{3}{8}, \text{ then } \frac{3}{8} = 8 \text{ times } \frac{1}{8} \text{ of}$$

$$\$281.25 = \$750, \text{ Ans.}$$

$$(4.) \quad 17 \text{ bu. } 2 \text{ pk.} = 70 \text{ pk. ;}$$

$$70 \div .07\frac{1}{2} = 933\frac{1}{3} \text{ pk.} = 233 \text{ bu. } 1\frac{1}{3} \text{ pk., Ans.}$$

$$(5.) \quad 75 + 93 + 112 = 280 ; \\ 280 \div .175 = 1600, \text{ Ans.}$$

$$(6.) \quad \$393 \div .131 = \$3000 ; \\ \$3000 - \$393 = \$2607, \text{ Ans.}$$

(ART. 270, p. 194.)

$$(3.) \quad 7402 \div 1.175 = 6299.57+, \text{ Ans.}$$

$$(8.) \quad 100 \% - 9\frac{1}{2} = 90\frac{1}{2} \% ; \\ 543 \div .905 = 600 \text{ men, Ans.}$$

$$(9.) \quad 100 \% - 10 \% = 90 \% ; \\ \frac{1\frac{1}{2}}{2\frac{1}{2}} \div \frac{90}{100} = \frac{1\frac{1}{2}}{2\frac{1}{2}} \times \frac{100}{90} = \frac{2\frac{2}{5}}{4\frac{2}{5}}, \text{ Ans.}$$

(ART. 271, p. 194.)

$$(11.) \quad 33\frac{1}{3} \% = \frac{33\frac{1}{3}}{100} = \frac{1}{3} ; \\ \frac{2}{3} - \frac{1}{3} = \frac{2}{3} ; 620 \div \frac{2}{3} = 930, \text{ Ans.}$$

$$(12.) \quad 16\frac{2}{3} \% = \frac{16\frac{2}{3}}{100} = \frac{1}{6} ; \\ \frac{5}{6} + \frac{1}{6} = \frac{6}{6} ; \frac{3}{4} \div \frac{7}{6} = \frac{9}{14}, \text{ Ans.}$$

(PAGES 194, 195.)

$$(1.) \quad 3640 \div 1.12 = 3250, \text{ Ans.}$$

$$(2.) \quad 100 \% - 31\frac{1}{4} \% = 68\frac{3}{4} \% ; \\ 440 \div .68\frac{3}{4} = 640, \text{ Ans.}$$

$$(4.) \quad 12\frac{1}{2} \% = \frac{12\frac{1}{2}}{100} = \frac{1}{8} ; \\ \frac{5}{8} + \frac{1}{8} = \frac{6}{8} ; 4059 \div \frac{6}{8} = 3608, \text{ Ans.}$$

$$(5.) \quad 26 \text{ d. } 10.4 \text{ h.} = 634.4 \text{ hours ;} \\ 100 \% + 30 \% = 130 \% = \frac{130}{100} = \frac{13}{10} ; \\ 634.4 \div \frac{13}{10} = 488 \text{ h.} = 20 \text{ d. } 8 \text{ h., Ans.}$$

COMMISSION AND BROKERAGE.

(ART. 276, p. 196.)

(3.) $\$10000 \times .00\frac{1}{4} = \$25, \text{ Ans.}$

(ART. 277, p. 197.)

(9.) $\$3838.80 \div 1.05 = \$3656, \text{ Ans.}$

(10.) $\$581.85 \div 1.025 = 567.65+, \text{ Ans.}$

(11.) $\$2050 \div 1.025 = \$2000;$
 $\$2000 \div 10 = 200 \text{ barrels, Ans.}$

(12.) $\$11000 \div 1.00\frac{7}{8} = \$10904.58+, \text{ Ans.}$

(13.) $\$64890 \div 1.03 = \$63000;$
 $\$63000 \div 700 = \$90, \text{ Ans.}$

•

INSURANCE.

(ART. 282, p. 198.)

(2.) $\$3560 \times .02 = \$71.20, \text{ Ans.}$

(3.) $\$5000 \times .03 = \$150;$
 $\$150 + \$1 = \$151, \text{ Ans.}$

(4.) $45 - 36 = 9 \text{ years;}$
 $\$541.30 \times 9 = \$4871.70. \text{ Ans.}$

(5.) $\$7500 \times .025 = \$187.50, \text{ Ans.}$

(6.) $\$98000 \times .03\frac{1}{4} = \$3185;$
 $\$98000 - \$3185 = \$94815, \text{ Ans.}$

PROFIT AND LOSS.

(ART. 285, p. 199.)

- (2.) $2340 \times .15 = \$351$, Ans.
- (3.) $\$8500 \times .21\frac{1}{2} = \1827.50 , Ans.
- (4.) $\$5000 \times .09 = \450 , Ans.
- (6.) $33\frac{1}{3} \% = \frac{33\frac{1}{3}}{100} = \frac{1}{3}$;
 $\frac{1}{3}$ of $\$.12 = \$.04$; $\$.12 + \$.04 = \$.16$ per lb., Ans.
- (7.) $.12\frac{1}{2} \% = \frac{12\frac{1}{2}}{100} = \frac{1}{8}$;
 $\frac{1}{8}$ of $\$.80 = \$.10$; $\$.80 + \$.10 = \$.90$, Ans.
- (8.) $10 \% = \frac{10}{100} = \frac{1}{10}$;
 $\frac{1}{10}$ of $\$130 = \13 ; $\$130 - \$13 = \$117$, Ans.
- (9.) $63 \times 60 = 3780$ gal.;
 $\$1512 \div 3780 = \$.40$ cost per gal.;
 $.15 \% = \frac{15}{100} = \frac{3}{20}$;
 $\frac{3}{20}$ of $\$.40 = \$.06$; $\$.40 + \$.06 = \$.46$, Ans.

(ART. 286, p. 200.)

- (2.) $14 \div 84 = 16\frac{2}{3} = 16\frac{2}{3} \%$, Ans.
- (3.) $.90 \div 4.50 = .20 = 20 \%$, Ans.
- (4.) $6.00 - 4.50 = 1.50$;
 $1.50 \div 4.50 = .33\frac{1}{3} = 33\frac{1}{3} \%$, Ans.
- (5.) $250 + 10 = \$260$ cost;
 $260 - 234 = \$26$;
 $26 \div 260 = .10 = 10 \%$, Ans.

- (6.) $10.20 \times 50 = \$510$ cost ;
 $\$85 \div \$510 = .16\frac{2}{3} = 16\frac{2}{3} \%$, Ans.
- (7.) If $\frac{1}{2}$ be sold for $\frac{4}{5}$ of the cost,
 $\frac{1}{2} = \frac{4}{5}$ of the cost, the gain is $\frac{4}{5} - \frac{1}{2} = \frac{3}{10}$; and $\frac{3}{10} =$
 [60 %, Ans
- (8.) If the price of $\frac{3}{4} =$ the cost of the whole, or $\frac{3}{4}$,
 $\frac{1}{4} = \frac{1}{3}$ of the cost, and $\frac{1}{3} = 33\frac{1}{3} \%$, Ans.
- (9.) $\$5000 - \$500 = \$4500$;
 $\$4500 - \$4000 = \$500$;
 $\$500 \div \$4500 = .11\frac{1}{3} = 11\frac{1}{3} \%$, Ans.

(ART. 287, p. 201.)

- (2.) $\$.90 \div .20 = \4.50 , Ans.
- (3.) $\$15 \div .0125 = \1200 , Ans.
- (5.) $100 \% - 95 \% = 5 \%$;
 $\$.30 \div .05 = \6.00 , Ans.
- (7.) $100 \% - 15 \% = 85 \%$;
 $\$204 \div .85 = \240 , Ans.
- (8.) $100 \% - 8\frac{1}{3} \% = 91\frac{2}{3} \%$;
 $\$.55 \div .91\frac{2}{3} = \$.60$, Ans.
- (9.) $100 \% + 18 \% = 118 \%$;
 $\$1.70 \div 118 = \1.44 , Ans.
- (10.) $\$4550 \div 700 = \6.50 ;
 $100 \% + 4 \% = 104 \%$,
 $\$6.50 \div 1.04 = \6.25 , Ans.

REVIEW EXERCISES.

(PAGE 202.)

- 1.) 4 ft. = 48 inches.
 If it falls short 3 inches, it falls short $\frac{3}{48} = \frac{1}{16} =$
 $[6\frac{1}{4} \%, \text{Ans.}]$
- (2.) $1\frac{2}{5}\% = \frac{1}{5}\% = 2 \%, \text{Ans.}$
- (3.) $\$550 \div .05 = 11000, \text{Ans.}$
- (5.) $100 \% + 10 \% = 110 \%;$
 $\$.88 \div 1.10 = \$.80 \text{ cost};$
 $\$1.00 - \$.80 = \$.20;$
 $\$.20 \div \$.80 = .25 = 25 \%, \text{Ans.}$
- (6.) $100 \% - 12 \% = 88 \%;$
 $\$132 \div .88 = \$150 \text{ cost};$
 $\$159 - \$150 = \$9;$
 $\$9 \div \$150 = .06 = 6 \%, \text{Ans.}$
- (8.) $100 \% + 25 \% = 125 \%;$
 $20 \% \text{ of } 125 \% = .25 \%;$
 $125 \% - 25 \% = 100 \% \text{ cost.}$
 Therefore, nothing is gained.
- (9) $100 \% + 25 \% = 125 \%;$
 $\$6000 \div 1.25 = \$4800, \text{cost of the first farm};$
 $100 \% - 25 \% = 75 \%;$
 $\$6000 \div .75 = \$8000, \text{cost of the second farm};$
 $\$8000 + \$4800 = \$12800;$
 $\$6000 \times 2 = \$12000;$
 $\$12800 - \$12000 = \$800 \text{ loss, Ans.}$

INTEREST.

(ART. 294, p. 206.)

$$\begin{array}{r}
 (2.) \quad \$960.50 \\
 \quad \underline{.08} \\
 \quad 76.84 \\
 \quad \quad \underline{2} \\
 \quad \$153.68, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (3.) \quad \$150.40 \\
 \quad \underline{.05} \\
 \quad \$7.5200 \\
 \quad \quad \underline{4} \\
 \quad \$30.08, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (4.) \quad \$1700 \\
 \quad \underline{.06} \\
 \quad \$102.00 \\
 \quad \quad \underline{5} \\
 \quad \$510, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (5.) \quad \$8000 \\
 \quad \underline{.073} \\
 \quad 24000 \\
 \quad 56000 \\
 \quad \$584.000 \\
 \quad \quad \underline{3} \\
 \quad \$1752, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (6.) \quad \$9080 \\
 \quad \underline{.035} \\
 \quad 45400 \\
 \quad 27240 \\
 \quad 317.80 \\
 \quad \quad \underline{2\frac{1}{2}} \\
 \quad 63560 \\
 \quad 15890 \\
 \quad \$794.50, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (7.) \quad \$71.20 \\
 \quad \underline{.04\frac{1}{4}} \\
 \quad 28480 \\
 \quad 1780 \\
 \quad 3.0360 \\
 \quad \quad \underline{1\frac{3}{4}} \\
 \quad 3.0260 \\
 \quad 2.0172 \\
 \quad 5.0432 +, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (8.) \quad \$30.16 \\
 \quad \underline{.07} \\
 \quad \$2.1112 \\
 \quad \quad \underline{1\frac{5}{8}} \\
 \quad 2.1112 \\
 \quad 17590 \\
 \quad \$28702, \text{ Ans.}
 \end{array}$$

| | | | |
|-------------------|-------------|-------------------|-------------|
| (9.) | \$56.78 | (12.) | \$19000 |
| | <u>.10</u> | | <u>.09</u> |
| | \$5.6780 | | \$1710.00 |
| | <u>3</u> | | <u>9</u> |
| Int. for 3 yrs. = | \$17.034 | Int. for 2 yrs. = | \$3420.00 |
| " " 6 mo. = | 2.839 | " " 1 mo. = | 142.50 |
| " " 3 " = | 1.419+ | " " 1 " = | 142.50 |
| " " 1 " = | .473 | " " 2 d. = | 9.50 |
| " " 1 " = | .473 | Ans. | \$3714.50 |
| Ans. | \$22.238+ | | |
| (10.) | \$300 | (13.) | \$2000 |
| | <u>.06</u> | | <u>.073</u> |
| | \$18.00 | | 6000 |
| | <u>2</u> | | 14000 |
| Int. for 2 yrs. = | \$36.00 | Int. for 1 yr. = | \$146. |
| " " 6 mo. = | 9.00 | | <u>5</u> |
| " " 1 " = | 1.50 | " " 5 " = | \$730. |
| " " 15 days = | .75 | " " 3 mo. = | 36.50 |
| Ans. | \$47.25 | " " 1 " = | 12.166 |
| | | " " 10 d. = | 4.055+ |
| (11.) | \$444 | Ans. | \$782.721+ |
| | <u>.05½</u> | | |
| | \$22.20 | (14.) | \$575 |
| | <u>2.22</u> | | <u>.06</u> |
| | \$24.42 | Int. for 1 yr. = | \$34.50 |
| | <u>6</u> | | <u>2</u> |
| Int. for 6 yrs. = | \$146.52 | " " 2 " = | 69.00 |
| " " 4 mo. = | 8.14 | " " 6 mo. = | 17.25 |
| " " 1 " = | 2.035 | " " 15 d. = | 1.437+ |
| " " 6 d. = | .407 | | \$87.687+ |
| " " 1 d. = | .067 | | <u>575</u> |
| Ans. | \$157.169+ | Ans. | \$662.687+ |

| | | |
|-------|------------------|--------------------|
| (15.) | | \$1234.56 |
| | | <u>.07</u> |
| | Int. for 1 yr. = | \$86.4192 |
| | | <u>8</u> |
| | " " 8 " = | \$691.3536 |
| | " " 4 mo. = | 28.8064 |
| | " " 4 " = | 28.8064 |
| | " " 1 " = | 7.2016 |
| | " " 10 d. = | <u>2.4005</u> |
| | | \$758.5685 |
| | | <u>1234.56</u> |
| | | \$1993.1285+, Ans. |

(ART. 295, p. 208.)

| | | |
|-------|-------------------------------|--------------|
| (17.) | $\frac{1}{2}$ of 5 mo. = .025 | \$64.24 |
| | $\frac{1}{2}$ of 6 d. = .001 | <u>.026</u> |
| | .026 | 38544 |
| | | <u>12848</u> |
| | | \$1.67, Ans. |

- (18.) $\$19.60 \times .175 = \3.43 , Ans.
 (19.) $\$75 \times .083\frac{1}{3} = \6.25 , Ans.
 (20.) $1000 \times .141\frac{1}{2} = \141.50 , Ans.
 (21.) $\$2000 \times .04 = \80 , Ans.
 (22.) $\$600.80 \times .075 = \45.06 , Ans.
 (24.) $\$1200 \times .004\frac{1}{2} = \5 , Ans.
 (25.) $3540 \times .0095 = \$33.63$, Ans.

(ART. 296, p. 209.)

| | | |
|------|---|--------------|
| 27.) | Principal = | \$140 |
| | Int. for 60 days = $\frac{1}{100}$ of prin. = | \$1.40 |
| | " " " " " " " " " " | 1.40 |
| | " " 3 " " $\frac{1}{20}$ " 60 days = | <u>.07</u> |
| | | \$2.87, Ans. |

34.) Principal = \$3600
 Int. at 6 % for 60 days = $\frac{1}{10}$ of prin. = \$36.00
 " " " " 6 " " $\frac{1}{10}$ of $\frac{1}{10}$ = 3.60
 Int. at 6 % = \$39.60
 $\frac{1}{6}$ of int. at 6 % = 6.60
 \$46.20, Ans.

(35.) Principal = \$1600
Int. at 6 % for 20 d. = $\frac{3}{10}$ of prin. = \$5.33 $\frac{1}{3}$
“ “ “ “ 1 “ “ $\frac{1}{10}$ “ “ .26 $\frac{2}{3}$
\$5.60
 $\frac{1}{6}$ of int. at 6 % = .93+
\$4.67, Ans.

(36.) Principal = \$15600

| | | | | | |
|------------------------------|---|------------------|----------|---|---------------|
| Int. at 6 % for 12 d. | = | $\frac{1}{800}$ | of prin. | = | \$31.20 |
| " " " " 1 " | " | $\frac{1}{8000}$ | " " | | 2.60 |
| | | | | | <hr/> |
| | | | | | \$33.80 |
| $\frac{1}{8}$ of int. at 6 % | = | | | | 5.63 + |
| Int. at 5 % | = | | | | <hr/> |
| | | | | | \$28.17, Ans. |

(37.) Principal = \$21.40

| | | |
|------------------------|--|---------------------|
| Int. at 6 % for 10 mo. | = $\frac{1}{8}$ of prin. | = \$1.070 |
| “ “ “ “ 1 “ “ ” | $\frac{1}{10}$ of $\frac{1}{8}$ of prin. | = .107 |
| | | <hr/> |
| Int. at 6 % = | | \$1.177 |
| “ “ 1 % = | | .196 |
| “ “ 7 % = | | <hr/> \$1.373, Ans. |

(38.) Principal = \$3.70

| | | | | | |
|------------------------|---|-----------------|----------|---|---------------|
| Int. at 6 % for 10 mo. | = | $\frac{1}{20}$ | of prin. | = | \$.185 |
| “ “ “ “ 2 “ “ | = | $\frac{1}{100}$ | “ “ | = | .037 |
| “ “ “ “ “ “ “ | = | | “ “ | = | .037 |
| | | | | | <hr/> |
| Int. at 6 % = | | | | | \$0.259 |
| “ “ 1 % = | | | | | <hr/> |
| “ “ 5 % = | | | | | \$.216, Ans. |

$$\begin{array}{r}
 (39.) \quad \$300 \\
 \quad \quad .09 \\
 \hline
 3)27.00 \\
 \quad \quad 9.00 \\
 \hline
 \$18., \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (40.) \quad \$750.40 \\
 \quad \quad .135 \\
 \hline
 375200 \\
 225120 \\
 75040 \\
 \hline
 2)101.30400 \\
 \quad 50.652 \\
 \hline
 \$151.956, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (41.) \quad \$344.45 \\
 \quad \quad .130\frac{1}{2} \\
 \hline
 1033350 \\
 34445 \\
 \hline
 17222 \\
 6)44.95072 \\
 \quad 7.4917+ \\
 \hline
 \$52.4424+, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (42.) \quad \$68.75 \\
 \quad \quad .081\frac{2}{3} \\
 \hline
 6875 \\
 55000 \\
 4583 \\
 \hline
 6)5.61458 \\
 \quad .93576+ \\
 \hline
 \$6.5502+, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (43.) \quad 3976.18 \\
 \quad \quad .141\frac{1}{2} \\
 \hline
 397618 \\
 1590472 \\
 397618 \\
 \hline
 132539 \\
 3)561.966 \\
 \hline
 187.322 \\
 \hline
 \$749.288+, \text{ Ans}
 \end{array}$$

$$\begin{array}{r}
 (44.) \quad \$80 \\
 \quad \quad .087 \\
 \hline
 560 \\
 640 \\
 \hline
 6.960 \\
 80 \\
 \hline
 \$86.96, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (45.) \quad \$241.20 \\
 \quad \quad .033\frac{1}{3} \\
 \hline
 72360 \\
 72360 \\
 8040 \\
 \hline
 6)8.04 \\
 \quad 1.34 \\
 \hline
 9.38 \\
 241.20 \\
 \hline
 \$250.58, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (46.) \quad \$500 \\
 \quad .028 \\
 \hline
 \quad 4000 \\
 \quad 1000 \\
 \hline
 \$)14. \\
 \quad 2.33\frac{1}{3} \\
 \quad 10 \\
 \hline
 \quad 23.33\frac{1}{3} \\
 \quad 500 \\
 \hline
 \$523.33\frac{1}{3}, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (47.) \quad \$345.94 \\
 \quad .014\frac{1}{3} \\
 \hline
 \quad 138376 \\
 \quad 34594 \\
 \quad 11531 \\
 \hline
 6)4.95847 \\
 \quad .82641+ \\
 \hline
 \quad 5.78488 \\
 \quad 345.94 \\
 \hline
 \$351.72, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (48.) \quad \$800 \\
 \quad .063 \\
 \hline
 \quad 2400 \\
 \quad 4800 \\
 \hline
 6)50.400 \\
 \quad 8.400 \\
 \hline
 \quad 42 \\
 \quad 800 \\
 \hline
 \$842, \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (49.) \quad \$1000 \\
 \quad .1825 \\
 \hline
 \quad 182.5000 \\
 \quad 1000 \\
 \hline
 \$1182.50, \text{ Ans}
 \end{array}$$

(ART. 298, p. 211.)

$$\begin{array}{l}
 (51.) \quad \text{Int. of } \$1000 \text{ for 1 year at } 7\frac{3}{10} \% = \$73.00 \\
 \quad \text{Time} = 138 \text{ days.} \\
 \quad \frac{138}{365} \text{ of } \frac{73}{1} = \$27.60, \text{ Ans.} \\
 \quad 5
 \end{array}$$

$$\begin{array}{l}
 (52.) \quad \text{Int. of } 6400 \text{ for 1 year at } 5 \% = \$320; \\
 \quad \text{Time} = 341 \text{ days.} \\
 \quad \frac{341}{365} \text{ of } \$320 = \$298.95, \text{ Ans.}
 \end{array}$$

(ART. 299, p. 211.)

- (2.) Int. of \$75 for 1 y. 4 m. 20 d. at 1 % = \$1.04 $\frac{1}{2}$;
 $\$6.25 \div \$1.04\frac{1}{2} = .06 = 6 \%$, Ans.
- (3.) Int. of \$3000 at 1 % = \$70;
 $\$525 \div \$70 = .07\frac{1}{2} = 7\frac{1}{2} \%$, Ans.
- (4.) Int. of \$3600 at 1 % = \$6.60;
 $\$46.20 \div \$6.60 = .07 = 7 \%$, Ans.
- (5.) Int. of \$150 at 1 % = \$6.00;
 $\$30 \div \$6 = .05 = 5 \%$, Ans.
- (6.) Int. of \$444 for 6 y. 5 m. at 1 % = \$28.49;
 $\$156.695 \div \$28.49 = .05\frac{1}{2} = 5\frac{1}{2} \%$, Ans.

(ART. 300, p. 212.)

- (2.) Int. of \$3000 at 7 % for 1 y. = \$210;
 $525 \div 210 = 2\frac{1}{2}$ years, Ans.
- (3.) Int. of \$700 1 y. = \$42;
 $63 \div 42 = 1\frac{1}{2}$ y. = 1 y. 6 m., Ans.
- (4.) Int. of \$4080 for 1 y. = \$204;
 $668.10 \div 204 = 3$ y. 3 m. 9 d., Ans.
- (5.) Int. of \$444 for 1 y. = \$24.42;
 $157.16 \div 24.42 = 6$ y. 5 m. 7 d., Ans.
- (6.) Int. of \$225 for 1 y. = \$13.50;
 $77.40 \div 13.50 = 5$ y. 8 m. 24 d., Ans.

(ART. 301, pp. 212, 213.)

- (2.) Int. of \$1 for 1 y. 6 m. = \$.09;
 $63 \div .09 = \$700$, Ans.
- (3.) Int. of \$1 for 3 y. = \$.219;
 $1752 \div .219 = \$8000$, Ans.

- (4.) Int. of \$1 for 3 y. 11 m. 21 d. = \$.238 $\frac{1}{2}$;
 $581.94 \div .2385 = \$2440$, Ans.
- (5.) Int. of \$1 for 6 m. 20 d. at 7 % = \$.038 $\frac{2}{3}$;
 $9.38 \div .038\frac{2}{3} = \241.20 , Ans.
- (6.) Int. of \$1 for 2 y. 3 m. at 9 % = \$.2025;
 $151.875 \div .2025 = \$750$, Ans.

(PAGES 213, 214.)

- (1.) Time = 6 m. 6 d.;
 Int. of \$400 = \$12.40; $\$400 + \$12.40 = \$412.40$,
 [Ans.]
- (2.) $\frac{1}{2}$ of \$20000 = \$10000;
 Int. of \$10000 for 2 y. 2 m. 12 d. at 6 % = \$1320;
 " " " " " " " " 7 % = 1540;
 $\$1320 + \$1540 = \$2860$, Ans.
- (4.) 1 % of \$250 = \$2.50 + \$250 = \$252.50, Ans.
- (5.) Time = 2 $\frac{1}{2}$ months;
 $1\frac{1}{2} \% \times 2\frac{1}{2} = 3\frac{3}{4} \%$;
 $\$200 \times .03\frac{3}{4} = \7.50 , Ans.
- (6.) Int. of \$194 at 1 % = \$.711 $\frac{1}{3}$;
 $4.268 \div .711\frac{1}{3} = 6 \%$, Ans.
- (7.) Int. of \$114 for 1 y. at 7 % = \$7.98;
 $13.80 \div 7.98 = 1\frac{2}{3}$ y. = 1 y. 8 m., Ans.
- (9.) $\frac{188}{168} \div \frac{17}{168} = 14\frac{2}{7}$ years, Ans.
 $\frac{188}{168} \div \frac{17}{1680} = 13$ y. 8 m. 11 $\frac{2}{3}$ d. Ans.
- (10.) Int. of \$1 for 2 y. 17 d. = \$.143 $\frac{11}{16}$;
 $37.26 \div .143\frac{11}{16} = \260.00 , Ans.

- (11.) Time in months = 6 months;
 " " days = 184 d.;
 Int. of \$10000 for 6 m. = \$300;
 " " " " 1 y. = \$600;
 $\frac{184}{365}$ of \$600 = \$302.465+
 $\$302.465+ - \$300 = \$2.465+$ more by the latter
 method, Ans.
-

PRESENT WORTH.

(ART. 303, pp. 214, 215.)

- (2.) Amt. of \$1 for 6 m. = \$1.03;
 $250 \div 1.03 = \$242.71+$, Ans.
- (3.) Amt. of \$1 for 72 days = \$1.014;
 $900 \div 1.014 = \$887.57$, Ans.
- (4.) Amt. of \$1 for 1 y. 4 m. = \$1.10 $\frac{2}{3}$;
 $650 \div 1.10\frac{2}{3} = \$587.34+$, Ans.
- (5.) Amt. of \$1 for 2 y. 7 m. 15 d. = \$1.1575;
 $347.25 \div 1.1575 = \$300$, Ans.
- (6.) Amt. of \$1 for 2 y = \$1.12;
 $672 \div 1.12 = \$600$, present worth;
 $\$672 - \$600 = \$72$, discount, Ans.
- (7.) Amt. of \$1 for 93 days = \$1.0155;
 $350.75 \div 1.0155 = \$345.396+$;
 $\$350.75 - \$345.396+ = 5.36+$, Ans.
- (8.) Amt. of \$1 for 2 y. 3 m. 20 d. = \$1.161 $\frac{1}{8}$;
 $750 \div 1.161\frac{1}{8} = \$645.77+$;
 $\$750 - \$645.77+ = \$104.23+$, Ans.

(ART. 304, p. 215.)

- (9.) Amt. of \$1 for 2 y. at 8 % = \$1.16;
 $1114.18 \div 1.16 = \$960.50$, Ans.
- (10.) Amt. of \$1 for 66 d. at 7 % = \$1.012 $\frac{1}{2}$;
 $3641.20 \div 1.012\frac{1}{2} = \$3595.06+$, Ans.
- (11.) Amt. of \$1 for 123 d. at 6 % = \$1.0205;
 $145.67 \div 1.0205 = \$142.743+$, Ans.
- (12.) Amt. of \$1 for 3 y. 3 m. 9 d. at 5 % = \$1.16375;
 $4748.10 \div 1.16375 = \$4080$, Ans.
-

APPLICATIONS.

(PAGE 215.)

- (1.) Amt. of \$1 for 9 m. = \$1.045;
 $385 \div 1.045 = \$368.42$, Ans.
- (2.) $\$1050 \times .05 = \52.50 , interest;
 $1050 \div 1.05 = \$1000$, present worth;
 $\$1050 - \$1000 = \$50$, discount;
 $\$52.50 - \$50.00 = \$2.50$, Ans.
- (3.) $\$1986.48 \div 1.025 = \1938.02 , the present worth of
 $\$1986.48$;
 $\$1938.02 - \$1831.53 = \$106.49$, Ans.
- (4.) $\$230 \div 1.0525 = \218.52 , the present worth of
 $\$230$;
 $\$225 - \$218.52 = \$6.48$, gain, Ans.

BANK DISCOUNT.

(ART. 308, pp. 216-218.)

- (2.) Int. of \$600 for 60 d. = \$6.00
 " " " " 3 " " 30
 Bank discount = \$6.30
 $\$600 - \$6.30 = \$593.70$, proceeds.
- (3.) The time when due = the last day of April, or April
 30th + 3 days of grace = May 3d.
 Int. of \$250 for 60 d. = \$2.50
 " " " " " " 2.50
 " " " " 3 d " .125
 Bank discount at 6 % a year = \$5.125
 At 1 % a month, or 12 % a year, = 2 times \$5.125 =
 $\$10.25$; $\$250 - \$10.25 = \$239.75$, proceeds.
- (4.) 4 months after July 5th = Nov. 5; Nov. 5 + 3 days
 of grace = Nov. 8th, time it is due. From
 Sept. 5 to Nov. 8 = 2 m. 3 d., time to run.
 Int. of \$1650.40 for 60 days = \$16.504
 " " " " 3 " " .825
 " or bank discount, at 6 % = \$17.329
 $\$17.329 + \frac{1}{8}$ of \$17.329 = \$20.217, bank discount, at
 7 %; $\$1650.40 - \$20.217 = \$1630.183$, proceeds.
- (5.) 90 days after June 10 = Sept. 8th; and 3 days of
 grace = Sept. 11th, time due.
 Time from July 13th to Sept. 11th = 60 days, time
 to run;
 Int. of \$5000 for 60 days = \$50; $\$5000 - \$50 =$
 $\$4950$, proceeds.

(ART. 309, p. 218.)

- (2.) Proceeds of \$1 for 4 m. 3 d. = \$.959;
 $239.75 \div .959 = \$250.00$, Ans.
- (3.) Proceeds of \$1 for 63 days = \$.9895;
 $593.70 \div .9895 = \$600$, Ans.
- (4.) Proceeds of \$1 for 93 days at 7 % = \$.981 $\frac{1}{2}$;
 $3755 \div .981\frac{1}{2} = \3824.15 , Ans.
- (5.) Proceeds of \$1 for 2 m. 3 d. at 2 % a month = \$.958;
 $576 \div .958 = \$601.25$, Ans.
- (6.) Proceeds of \$1 for 33 days = \$.9945;
 $994.50 \div .9945 = \$1000$, Ans.

ANNUAL INTEREST.

(PAGES 219, 220.)

- (2.) Int. of \$500 for 3 y. = \$90.00
 " " " " 1 y. = \$30
 " " \$30 " 2 y. + 1 y., or for 3 years = $\frac{5.40}{\$95.40}$
 $\$500 + \$95.40 = \$595.40$, Ans.
- (3.) Int. of \$200 for 2 y. 6 m. 3 d. = \$30.10;
 " " " " 1 y. = \$12; and
 " " \$12 for 1 y. 6 m. 3 d. + 6 m. 3 d. = 2 y. 6 d.
 = \$1.45+;
 $\$30.10 + \$1.45 = \$31.55+$, Ans.

| | | |
|------|--------------------------------|--------------|
| (3.) | Principal, | \$500.00 |
| | Int. of \$500 for 1 y. at 7 %, | <u>35.00</u> |
| | Amount, | \$535.00 |
| | Payment, | \$200.00 |
| | Int. for 3 months, | <u>3.50</u> |
| | | \$203.50 |
| | Balance due, | \$331.50 |

(ART. 314, pp. 222-224.)

| | | |
|------|---------------------------------|---------------|
| (2.) | Principal, | \$625.50 |
| | Int. to Jan. 1, 1865, | <u>9.38</u> |
| | Amount, | \$634.88 |
| | 1st payment, | <u>200.00</u> |
| | New principal, | \$434.88 |
| | Int. to Jan. 1, 1866, | <u>26.09</u> |
| | Amount, | \$460.97 |
| | 2d payment, less than int. due, | \$20 |
| | 3d payment, | <u>300</u> |
| | | 320.00 |
| | New principal, | \$140.97 |
| | Int. to May 1, 1866, | <u>2.82</u> |
| | Amount due May 1, 1866, | \$143.79 |

| | | |
|------|--|---------------|
| (3.) | Principal, | \$2400.00 |
| | Int. for 1 y. at 7 %, | <u>168.00</u> |
| | Amount, | \$2568.00 |
| | Payment, | <u>400.00</u> |
| | New principal, | \$2168.00 |
| | Int. from Aug. 16, 1865, to Nov. 30, 1866, | <u>195.60</u> |
| | Amount, | \$2363.60 |
| | Payment, | <u>67.89</u> |
| | Balance due, | \$2295.71 |

| | | |
|------|--|------------------|
| (4.) | Principal, | \$5660.00 |
| | Int. for 1 y. 1 m. 15 d. | 318.37 |
| | Amount, | <u>\$5978.37</u> |
| | 1st Payment, | 578.33 |
| | New principal, | <u>\$5400.04</u> |
| | Int. from June 16, 1864, to June 16, 1866, | 540.00 |
| | Amount, | <u>\$5940.04</u> |
| | Payments, \$160 + \$420, | 580.00 |
| | New principal, | <u>\$5360.04</u> |
| | Int. from June 16, 1866, to Feb. 16, 1867, | 178.67 |
| | Balance due, | <u>\$5538.71</u> |

(ART. 315, p. 225.)

| | | |
|------|---|------------------|
| (1.) | Principal, | \$1000.00 |
| | Int. for 1 y. | 60.00 |
| | Amount, | <u>\$1060.00</u> |
| | 1st payment, | \$100 |
| | Int. from Jan. 1, to July 1, 1865, | 3 |
| | | <u>103.00</u> |
| | New principal, | <u>\$957.00</u> |
| | Int. from July 1, 1865, to Sept. 1, 1866, | 66.99 |
| | Amount, | <u>\$1023.99</u> |
| | 2d payment, | 223.99 |
| | New principal, | <u>\$800.00</u> |
| | Int. from Sept. 1, 1866, to Jan. 1, 1867, | 16.00 |
| | Amount, | <u>\$816.00</u> |
| | 3d payment, | 12.00 |
| | Balance due Jan. 1, 1867, | <u>\$804.00</u> |

(ART. 316, pp. 224, 225.)

| | | | |
|------|---|----------|-----------|
| (1.) | Principal, | | \$500C |
| | Int. to June 1, 1869, 1 y. 6 m. | \$450 | |
| | 1st payment, | 400 | |
| | Balance of int. | \$50 | |
| | Int. of prin. from June 1, to Dec. 1, 1869, | 150 | 200 |
| | Amount, | | \$5200 |
| | 2d payment, | | 2200 |
| | New principal, | | \$3000 |
| | Int. from Dec. 1, 1869, to June 1, 1870, | | 90 |
| | Amount due, | | \$3090 |
| (2.) | Principal, | | \$1000.00 |
| | Int. on \$1000 from Oct. 1, 1862, to | | |
| | Oct. 1, 1865, | \$60.00 | |
| | Int. on \$60 from Oct. 1, 1863, to | | |
| | Oct. 1, 1864, | 3.60 | |
| | Int. on \$1000 from Oct. 1, 1863, to | | |
| | Oct. 1, 1864, | 60.00 | |
| | Unpaid interest, | \$123.60 | |
| | 1st payment, | \$50.00 | |
| | Int. on \$50, | 1.50 | 51.50 |
| | Balance of int. Oct. 1, 1864, | \$72.10 | |
| | Int. on \$72.10 from Oct. 1, 1864, to | | |
| | Oct. 1, 1865, | 4.33 | |
| | Int. on \$1000 from Oct. 1, 1864, to | | |
| | Oct. 1, 1865, | 60.00 | |
| | Unpaid int. Oct. 1, 1865, | | \$136.43 |
| | Amount, | | \$1136.43 |
| | 2d payment, | \$400 | |
| | Int. on \$400 for 4 mo. | 8 | |
| | 3d payment, | 200 | |
| | Int. on \$200 for 2 mo | 2 | 610.00 |
| | Balance due Oct. 1, 1865, | | \$526.43 |

COMPOUND INTEREST.

(ART. 318, p. 227.)

| | | |
|------|---------------------------|---------------|
| (2.) | Principal, | \$100.00 |
| | Int. for 1 year | <u>6.00</u> |
| | Amount, or 2d principal, | \$106.00 |
| | Int. for 2d year, | <u>6.36</u> |
| | Amount, | \$112.36 |
| | Int. for 3d year. | <u>6.741</u> |
| | Amount, | \$119.101 |
| | | |
| (3.) | Principal, | \$600.50 |
| | Int. for 1st year, | <u>30.025</u> |
| | Amount, or 2d principal, | \$630.525 |
| | Int. for 2d year, | <u>31.526</u> |
| | Amount, or 3d principal, | \$662.051 |
| | 1st principal, | <u>600.50</u> |
| | Compound interest, | \$61.551 |
| | | |
| (4.) | Principal, | \$300.00 |
| | Int. for 1st year, | <u>21.00</u> |
| | Amount, or 2d principal, | \$321.00 |
| | Int. for 2d year, | <u>22.47</u> |
| | Amount, or 3d principal, | \$343.47 |
| | Int. for 3d year, | <u>24.042</u> |
| | Amount, or 4th principal, | \$367.512 |
| | Int for 4 m. 15 d., | <u>9.647</u> |
| | Amount, | \$377.159 |
| | 1st principal, | <u>300.00</u> |
| | Compound interest, | \$77.159 |

| | | |
|------|--------------------------------|---------------|
| (5.) | 1st principal, | \$860.00 |
| | Int. for 6 months, | <u>34.40</u> |
| | Amount, or 2d principal, | \$894.40 |
| | Int. for 2d 6 months, | <u>35.776</u> |
| | Amount, or 3d principal, | \$930.176 |
| | Int. for 3d 6 months, | <u>37.207</u> |
| | Amount, or 4th principal, | \$967.383 |
| | Int. for 4th 6 months, | <u>38.695</u> |
| | Amount, or 5th principal, | \$1006.078 |
| | Int. for 5th 6 months, | <u>40.243</u> |
| | Amount, or 6th principal, | \$1046.321 |
| | Int. for 6th or last 6 months, | <u>41.852</u> |
| | Amount, | \$1088.173 |
| | | |
| (6.) | 1st principal, | \$500.00 |
| | Int. for 1st year, | <u>25.00</u> |
| | Amount, or 2d principal, | \$525.00 |
| | Int. for 2d year, | <u>26.25</u> |
| | Amount, or 3d principal, | \$551.25 |
| | Int. for 3d year, | <u>27.562</u> |
| | Amount, or 4th principal, | \$578.812 |
| | Int. for 4th year, | <u>28.940</u> |
| | Amount, or 5th principal, | \$607.752 |
| | Int. for 2 m. 15 d., | <u>6.33+</u> |
| | Amount, | \$614.08+ |

(ART. 319, pp. 223, 229.)

- (8.) Amount of \$1 for 20 years at $2\frac{1}{2}\%$ = \$1.638616;
 $\$1.638616 \times 100 = \$163.86+$, Ans.
- (9.) Amount of \$1 for 20 years = \$3.869685;
Amount of \$1 for 10 years = \$1.967151;
 $\$3.869685 \times 1.967151 = \7.612254 ;
 $\$7.612254 \times 50 = \$380.61+$, Ans.

REVIEW EXERCISES.

(PAGE 229.)

- (1.) $\$5400 \times .03 = \162 ;
 $\$5400 + \$162 = \$5562$, Ans.
- (2.) Time = 1 y. 5 m. 1 d.;
 Int. of \$1 = $.085\frac{1}{8}$;
 $\$250 \div .085\frac{1}{8} = \$2935.42+$, Ans.
- (3.) At 1 % it will double itself in 100 years;
 $100 \div 14\frac{2}{7} = 7\%$, Ans.
- (4.) Int. of \$250 for 1 year = \$15;
 $65 \div 15 = 4\frac{1}{3}$ years = 4 y. 4 m.;
 July 15, 1866 — 4 y. 4 m. = March 15, 1862, Ans.
- (5.) $\$800 \div 1.203 = \665 , present worth;
 $\$800 - 665 = \135 , true discount;
 Int. of \$800 for 3. y. 4 m. 21 d. = bank discount =
 $\$162.80$; $\$162.80 - \$135 = \$27.80+$, Ans.
- (6.) Present worth of \$220, due 2 years hence, at 6 % =
 $\$196.42+$;
 $\$200 - \$196.42 = \$3.58+$; therefore,
 $\$200$ cash in hand is the better offer by $\$3.58+$.
- (7.) 6 months after April 10, 1866 = Oct. 10, 1866 =
 time it is due; or, with 3 days of grace, Oct. 13
 Time from Aug. 11 to Oct. 13 = 63 days;
 Int. of \$500 for 63 days = \$5.25;
 $\$500 - \$5.25 = \$494.75$, proceeds.
- (8.) Compound interest = $\$341.21$
 Annual interest = $\underline{\$340.08}$
 Difference, $\$1.13$, Ans.

RATIO AND PROPORTION.

(ART. 325, p. 231.)

- | | | | |
|------|-------------------|-------|---------|
| (3.) | Ans. 6 : 4 | (9.) | Ans. 4. |
| (6.) | 2 : $\frac{1}{2}$ | (12.) | 12. |

(ART. 328, p. 232.)

- | | | | |
|------|---------|------|--------------------------|
| (4.) | Ans. 11 | (8.) | Ans. 200 qt., or 50 gal. |
|------|---------|------|--------------------------|

(ART. 330, pp. 234, 235.)

- (2.) 12 : 30 :: \$16 : \$40, Ans.
- (3.) 183 : 61 :: \$273 : \$91, Ans.
- (4.) \$56 : \$16 :: 98 bu. : 28 bu., Ans.
- (5.) \$16 : \$72 :: 12 yd. : 54 yd., Ans.
- (6.) 5 : 45 :: 40 m. : 360 m., Ans.
- (7.) 5 : $12\frac{2}{3}$:: \$6 $\frac{3}{8}$: \$15.81, Ans.
- (8.) \$63 : \$18 :: 385 kilos : 110 kilos., Ans.
- (9.) 6 : 8 :: 32 days : $42\frac{2}{3}$ days, Ans.
- (10.) \$200 : \$300 :: 8 mo. : 12 mo., Ans.
- (11.) 8 : 12 :: 100 men : 150 men, Ans.
- (12.) $\frac{3}{4}$: $\frac{1}{2}$:: 12 yd. : 8 yd., Ans.
- (13.) $\frac{4}{10}$: $\frac{1}{4}$:: \$2 : \$1.25, Ans.
Or, 4 : 25 :: \$2.00 : \$1.25, Ans.
- (14.) $\frac{3}{16}$: $\frac{2}{6}$:: \$9750 : \$42000, Ans.
- (15.) 15 : 34 :: 75 : 170, Ans.
- (16.) 3 : 2 :: 210 : 140, Ans.

- (17.) 3 cords, 5 c. ft. = 3.625 cords.
 1 T. 5 cwt. 3 qr. = 1.2875 tons;
 1.2875 : 1 :: 3.625 cords : 2 C. 6+ c. ft., Ans.
- (18.) 150 : 225 :: $5\frac{1}{2}$ h. : 8 h. 15 m., Ans.
- (19.) $8 + 2 : 8 :: 10$ d. : 8 d., Ans.
- (20.) 5 : 3 :: 14 oz. : $8\frac{2}{5}$ oz., Ans.
- (21.) 7 ft. 6 in. = 90 in.; 9 ft. 2 in. = 110 in.;
 110 : 90 :: 70400 times : 57600 times, Ans.
- (22.) 4 A. 84 sq. rd. = 4.525 A.;
 125 : 650 :: 4.525 A. : 23.53 A. = 23 A. 84.8 P., Ans.
- (23.) 5 : 129 :: 7 ft. : 180.6 ft. = 180 ft. $7\frac{1}{5}$ in., Ans.
- (24.) 7 : 3 :: 22400 : 9600;
 22400 — 9600 = 12800, Ans.

(ART. 331, p. 236.)

- (26.) $7 + 9 = 16$;
 16 : 7 :: 640 acres : 280 acres, 1st man's.
 16 : 9 :: 640 acres : 360 " 2d man's.
- (27.) $\frac{1}{2} + \frac{2}{3} + \frac{4}{5} = \frac{58}{30}$;
 $\frac{58}{30} : \frac{1}{2} :: 4720 : 1200$;
 $\frac{58}{30} : \frac{2}{3} :: 4720 : 1600$;
 $\frac{58}{30} : \frac{4}{5} :: 4720 : 1920$, } Ans.
- (28.) $13 + 12 = 25$;
 25 : 13 :: 4500 : 2340;
 25 : 12 : 4500 : 2160, Ans.

(ART. 333, pp. 236-238.)

- (2.) $6 : 12$
 $4 : 9 :: 16 \text{ acres} : 72 \text{ acres, Ans.}$
- (3.) $36 : 120$
 $7 : 5 :: \$98 : \$233\frac{1}{3}, \text{ Ans.}$
- (4.) $10 : 6$
 $16 : 40 :: 4 \text{ days} : 6 \text{ days, Ans.}$
- (5.) $90 : 540$
 $6 : 8 :: 3 \text{ days} : 24 \text{ days, Ans}$
- (6.) $9 : 24$
 $8 : 16 :: \$600 : \$3200, \text{ Ans.}$
- (7.) $11 : 33$
 $18 : 5 :: 12 \text{ horses} : 10 \text{ horses, Ans.}$
- (8.) $2000 : 6000$
 $150 \times 4 = 600 : 150 :: 3 \text{ months} : 2\frac{1}{4} \text{ months, Ans.}$
- (9.) $200 : 590$
 $4 : 15 :: \$4 : \$44.25, \text{ Ans.}$
- (10.) $5 : 12$
 $\frac{2}{3} : 3 :: \frac{3}{4} \text{ day} : 13\frac{1}{2} \text{ days, Ans.}$
- (11.) $12 : 5$
 $100 : 160 :: \$750 : \$500, \text{ Ans.}$
- (12.) $30 : 60$
 $64 : 24 :: 18 \text{ men} : 18 \text{ men, Ans.}$
 $6 : 8$
- (13.) $29 : 20$
 $5 : 8\frac{1}{2} :: 32 \text{ acres} : 40 \text{ acres, Ans.}$
 $12 : 13$

PARTNERSHIP.

(ART. 335, pp. 239, 240.)

(2.) $\$1500 + \$1950 + \$2100 = \5550 ;

A receives $\frac{1500}{5550}$, or $\frac{10}{37}$ of $\$1665 = \450 .B " $\frac{1950}{5550}$, or $\frac{13}{37}$ of $\$1665 = \585 .C " $\frac{2100}{5550}$, or $\frac{14}{37}$ of $\$1665 = \630 .

(3.) $\$240 + \$360 + \$120 = \720 ;

A receives $\frac{240}{720}$, or $\frac{1}{3}$ of $\$350 = \$116.66\frac{2}{3}$.B " $\frac{360}{720}$, or $\frac{1}{2}$ of $\$350 = \175 .C " $\frac{120}{720}$, or $\frac{1}{6}$ of $\$350 = \$58.33\frac{1}{3}$.

(4.) A's share = $\frac{48}{108}$, or $\frac{4}{9}$ of 45 = 20 tons.

B's " = $\frac{36}{108}$, or $\frac{1}{3}$ of 45 = 15 "C's " = $\frac{24}{108}$, or $\frac{2}{9}$ of 45 = 10 "

(5.) A's share = $\frac{3}{5}$ of $\$2000 = \1200 .

B's " = $\frac{2}{5}$ of $\$2000 = \800 . $\$1200 - \$800 = \$400$ for A's services.

(ART. 336, p. 240.)

(6.) $\$8000 + \$12000 = \$20000$;

A receives $\frac{8000}{20000}$, or $\frac{2}{5}$ of $\$6000 = \2400 .B " $\frac{12000}{20000}$, or $\frac{3}{5}$ of $\$6000 = \3600 .

(7.) $21 + 17 + 47 = \$85$;

The first pays $\frac{2}{5}$ of $\$307 = \$75.84+$." second pays $\frac{1}{5}$, or $\frac{1}{5}$ of $\$307 = \61.40 ." third pays $\frac{4}{5}$ of $\$307 = \$169.75+$.

(8.) $\$5000 + \$3000 + \$2500 = \10500 ;

Wife's share = $\frac{5000}{10500}$, or $\frac{10}{21}$ of $\$7475 = \$3559.52+$.Elder son's sh. = $\frac{3000}{10500}$, or $\frac{2}{7}$ of $\$7475 = \$2135.71+$.Younger son's share = $\frac{2500}{10500}$, or $\frac{5}{21}$ of $\$7475 =$ $\$1779.76+$.

(ART. 337, pp. 241, 242.)

- (2.) A's \$6000 for 7 mo. = \$42000 for 1 mo. ;
 B's \$9000 " 5 " = 45000 " " "
 C's \$1200 " 4 " = 48000 " " "
 Entire stock, \$135000 " " "
 A's share = $\frac{42000}{135000}$, or $\frac{14}{45}$ of \$4500 = \$1400.
 B's " = $\frac{45000}{135000}$, or $\frac{1}{3}$ of \$4500 = \$1500.
 C's " = $\frac{48000}{135000}$, or $\frac{16}{45}$ of \$4500 = \$1600.

- (3.) A's \$500 for 18 mo. = \$9000 for 1 month ;
 B's \$380 " 13 " = 4940 " " "
 C's \$270 " 9 " = 2430 " " "
 Entire stock = \$16370 " " "
 A's share = $\frac{9000}{16370}$, or $\frac{900}{1637}$ of \$818.50 = \$450.
 B's " = $\frac{4940}{16370}$ of \$818.50 = \$247.
 C's " = $\frac{2430}{16370}$ of \$818.50 = \$121.50.

- (4.) 80 sheep for 6 mo. = 480 sheep for 1 month ;
 40 " " " " = 240 " " " "
 Jones's stock = 720 " " " "
 100 sheep for 6 mo. = 600 sheep for 1 month ;
 50 " " " " = 300 " " " "
 Smith's stock = 900 " " " "
 50 sheep for 6 mo. = 300 sheep for 1 month ;
 Hall's stock = 300 " " " "
 Entire stock = 720 + 900 + 300 sheep = 1920 sheep
 for 1 month.

Jones pays $\frac{720}{1920}$, or $\frac{3}{8}$ of \$275 = \$103.12 $\frac{1}{2}$.
 Smith " $\frac{900}{1920}$, or $\frac{15}{32}$ of \$275 = \$128.90 $\frac{3}{4}$.
 Hall " $\frac{300}{1920}$, or $\frac{5}{32}$ of \$275 = \$42.96 $\frac{7}{8}$.

(5.) \$500 for 12 mo. = \$6000 for 1 month;

\$150 " 7 " = $\frac{1050}{7}$ " " "

A's stock = \$7050 " " "

\$600 for 9 mo. = \$5400 for 1 month;

\$400 " 3 " = $\frac{1200}{3}$ " " "

B's stock = \$6600 " " "

Entire stock = \$7050 + \$6600 = \$13650.

A's share = $\frac{7050}{13650}$, or $\frac{11}{21}$ of \$682.50 = \$352.50.

B's " = $\frac{6600}{13650}$, or $\frac{4}{7}$ of \$682.50 = \$330.

(6.) A's \$35000 for 2 mo. = \$70000 for 1 month;

" 24000 " 3 " = 72000 " " "

" 20000 " 2 " = $\frac{40000}{2}$ " " "

" entire stock = \$182000 " " "

B's \$11000 for 5 mo. = \$55000 for 1 month.

C's \$4000 for 2 mo. = \$8000 for 1 month.

Entire stock = 182000 + 55000 + 8000 = \$245000.

A's share = $\frac{182000}{245000}$, or $\frac{14}{19}$ of \$9700 = \$7205.71+.

B's " = $\frac{55000}{245000}$, or $\frac{5}{24}$ of \$9700 = \$2177.55+.

C's " = $\frac{8000}{245000}$, or $\frac{8}{245}$ of \$9700 = \$316.73+.

(7.) S's stock was in trade, 12 mo.;

T's = $\frac{1}{5}$ as much for 10 mo., or the same for $\frac{1}{5}$ of 10 mo., or 2 months;

Y's = $\frac{2}{3}$ as much as for 4 mo., or the same for $\frac{2}{3}$ of 4 mo., or 3 months;

12 mo. + 2 mo. + 3 mo. = 17 months.

S's share = $\frac{12}{17}$ of \$3400 = \$2400.

T's " = $\frac{2}{17}$ of \$3400 = \$400.

Y's " = $\frac{3}{17}$ of \$3400 = \$600.

EQUATION OF PAYMENTS.

(ART. 341, p. 243.)

$$\begin{array}{rcl}
 (2.) & 2 \text{ mo.} \times 500 & = 1000 \text{ months;} \\
 & 5 \text{ " } \times 1000 & = 5000 \text{ " } \\
 & 8 \text{ " } \times 1500 & = \underline{12000} \text{ " } \\
 & 3000 &) \quad 18000 \text{ " } \\
 & & \quad 6 \text{ months, Ans.}
 \end{array}$$

$$\begin{array}{rcl}
 (3.) & 0 \text{ days} \times 1600 & = 0 \text{ days;} \\
 & 90 \text{ " } \times 800 & = \underline{72000} \text{ " } \\
 & 2400 &) \quad 72000 \\
 & & \quad 30 \text{ days, Ans.}
 \end{array}$$

$$\begin{array}{rcl}
 (4.) & 3 \text{ mo.} \times 40 & = 120 \text{ months;} \\
 & 5 \text{ " } \times 60 & = 300 \text{ " } \\
 & 10 \text{ " } \times 100 & = \underline{1000} \text{ " } \\
 & 200 &) \quad 1420 \text{ " } \\
 & & \quad 7\frac{1}{10} \text{ mo.} = 7 \text{ months, 3 days.} \\
 & \text{March 1} + 7 \text{ mo. 3 days} & = \text{Oct. 4, Ans.}
 \end{array}$$

$$\begin{array}{rcl}
 (5.) & 30 \text{ days} \times 200 & = 6000 \\
 & 60 \text{ " } \times 150 & = 9000 \\
 & 90 \text{ " } \times 300 & = \underline{27000} \\
 & 650 &) \quad 42000 \\
 & & \quad 64\frac{2}{3}, \text{ reckoned 65 days.} \\
 & \text{May 16} + 65 \text{ days} & = \text{July 20, Ans.}
 \end{array}$$

(ART. 342, pp. 244, 245.)

$$\begin{array}{rcl}
 (1.) & \text{Due Aug. 31, } 0 \text{ days} \times 1000 & = 0 \text{ days;} \\
 & \text{" Sept. 1, } 1 \text{ " } \times 200 & = 200 \text{ " } \\
 & \text{" " 19, 19 " } \times \underline{600} & = \underline{11400} \text{ " } \\
 & 1800 &) \quad 11600 \\
 & & \quad 6 \text{ days} +. \\
 & \text{Aug. 31} + 6 \text{ days} & = \text{Sept. 6, Ans.}
 \end{array}$$

(3.) Due April 1, 0 mo. $\times 1400 = 0$ months;
 " May 1, 1 " $\times 500 = 500$ "
 " June 1, 2 " $\times 1100 = 2200$ "
 $\qquad\qquad\qquad 3000) \quad 2700$ "
 $\frac{9}{10}$ mo. = 27 days. $\frac{9}{10}$ "
 April 1 + 27 days = April 28, Ans.

(4.) Due Jan. 1, 0 days $\times 735 = 0$ days;
 " Feb. 20, 50 " $\times 650 = 32500$ "
 " " 1, 31 " $\times 100 = 3100$ "
 " April 11, 100 " $\times 200 = 20000$ "
 $\qquad\qquad\qquad 1685) \quad 55600$ "
 $\qquad\qquad\qquad 33$ days nearly
 Jan. 1 + 33 days = Feb. 3, Ans.

(ART. 343, p. 245.)

(5.) Due April 1, 0 days $\times 1450 = 0$ days;
 " May 7, 36 " $\times 1250 = 45000$ "
 " June 5, 65 " $\times 850 = 55251$ "
 $\qquad\qquad\qquad 3550) \quad 100251$ "
 $\qquad\qquad\qquad 28$ "
 April 1 + 28 days = April 29, the average date;
 April 29 + 4 mo. = Aug. 29 = equated time, Ans.

(6.) Due Jan. 15, 0 days $\times 3750 = 0$ days;
 " Feb. 10, 26 " $\times 3000 = 78000$ "
 " Mar. 6, 50 " $\times 2400 = 120000$ "
 " June 8, 144 " $\times 2250 = 324000$ "
 $\qquad\qquad\qquad 11400) \quad 522000$ "
 $\qquad\qquad\qquad 46$ days nearly.
 Jan. 15 + 46 days = Mar. 2 = average date;
 Mar. 2 + 6 mo. = Sept. 2 = equated time, Ans.

AVERAGING ACCOUNTS.

(ART. 346, p. 247.)

- (2.) Due July 30, 0 days $\times 550 =$ 0 days;
 " Aug. 14, 15 " $\times 850 = \underline{12750}$ "
 1400 12750 "
 Due July 31, 1 day $\times 400 =$ 400 days;
 " Aug. 4, 5 " $\times 300 = \underline{1500}$ "
 700 1900 "
 $\$1400 - \$700 = \$700$ balance;
 $12750 - 1900 = 10850$ days;
 $10850 \div 700 = 16$ days nearly.
 July 30 + 16 days = Aug. 15, time due, **Ans.**

- (3.) Due Nov. 3, 0 days $\times 500 =$ 0 days;
 " Dec. 23, 50 " $\times 600 = \underline{30000}$ "
 1100 30000 "
 Due Nov. 13, 10 days $\times 700 =$ 7000 days;
 $1100 - 700 = 400$;
 $30000 - 7000 = 23000$ days;
 $23000 \div 400 = 58$ days nearly.
 Nov. 3 + 58 days = Dec. 31, 1866, **Ans.**

- (4.) Due July 15, 26 days $\times 300 =$ 7800 days;
 " Aug. 2, 44 " $\times 50 =$ 2200 "
 " July 31, 42 " $\times 150 = \underline{6300}$ "
 500 16300 "
 Due June 19, 0 days $\times 200 =$ 0 days;
 " Sept. 17, 90 " $\times 200 = \underline{18000}$ "
 400 18000 "
 $300 + 49.60 + 150 = 499.60 - 400 = \99.60 , face
 of the note;
 $18000 - 16300 = 1700$ days;
 $1700 \div 100 = 17$ days.
 June 19 - 17 days = June 2, **Ans.**

INTEREST METHOD.

(ART. 352, p. 249.)

(4.) Int. on \$600 for 62 days = \$7.23+.

$$\begin{array}{r}
 \text{" " } \frac{200}{\$800} \text{" 0 " = } \frac{0}{\$7.23} \\
 \hline
 7.23 \\
 \$807.23
 \end{array}$$

Int. on \$700 for 121 days = \$16.46+;

\$700 + \$16.46 = \$716.46;

\$807.23 - \$716.46 = \$90.77, Ans.

(5.) Int. on \$300 for 48 days = \$2.40

" " 50 " 30 " = .25

" " $\frac{150}{\$500}$ " 32 " = $\frac{.80}{\$3.45}$

Int. on \$300 for 64 days = \$3.20

" " $\frac{200}{\$500}$ " 16 " = $\frac{.53}{\$2.67}$

\$3.45 - \$2.67 = \$.78, Ans.

CUSTOMS.

(ART. 364, p. 253.)

(2.) \$5600 \times .30 = \$1680, Ans.(3.) 200 \times 25 = 5000 kilos. ,5000 \times 2.2046 = 11023 lb. ;11023 \times .02 = 220.46 lb. ;

11023 - 220.46 = 10802.54 lb. ;

10802.54 \times .05 = \$540.127, Ans.

- (4.) $6000 \times .09 = 540$;
 $6000 - 540 = 5460$;
 $5460 \times .20 = \$1092$, **Ans.**
- (5.) $2240 \times 5 = 11200$ lb. ;
 $11200 \times .22 = \$2464$;
 $\$2464 \times .20 = \492.80 , **Ans.**

—

STOCKS.

(ART. 368, p. 254.)

- (1.) $110 + \frac{1}{4} = 110\frac{1}{4} \%$; $\$5000 \times 1.10\frac{1}{4} = \5512.50 .
- (2.) $110 + \frac{1}{4} = 110\frac{1}{4} \%$; $\$5512.50 \div 1.10\frac{1}{4} = \5000 .
- (3.) $\$100 \times .91 = \91 ; $\$5460 \div \$91 = 60$.
- (4.) $\$20000 \times .05 = \1000 ; $\$1000 \times 1.05\frac{3}{4} = \1057.50 .
- (5.) $\$100 \times .06 = \6 ; $\frac{6}{100}$ of 100 % = $7\frac{1}{2} \%$.
- (6.) At 100 it pays 10 % ; hence, to pay 8 % , it must be bought at $\frac{100}{108}$ of 100, or at 125.
- (8.) $\$600$ semi-annually = $\$1200$ annually. $\$1200 \div .08 = \15000 . $\$15000 \times 1.12 = \16800 .

DOMESTIC OR INLAND EXCHANGE.

(ART. 377, p. 257.)

- (3.) $\$500 \times .99\frac{1}{2} = \$497.50.$
 Int. of \$500 for 63 days at 7 % = \$6.125.
 $\$497.50 - \$6.125 = \$491.37\frac{1}{2}, \text{ Ans.}$
- (4.) $\$1940 \times 1.01\frac{1}{4} = \$1964.25, \text{ Ans.}$
- (5.) $\$920 \times .99\frac{3}{4} = \$917.70.$
 Int. of \$920 for 93 days at 8 % = \$19.01.
 $\$917.70 - \$19.01 = \$898.69, \text{ Ans.}$
- (6.) $\$3000 \times 1.01 = \$3030.$
 Int. of \$3000 for 2 mo. 3 days = \$31.50.
 $\$3030 - \$31.50 = \$2998.50, \text{ Ans.}$

(ART. 378, pp. 257, 258.)

- (2.) $\$6075 \div \$1.0125 = \$6000, \text{ Ans.}$
- (3.) $\$1.00 - .02 = \$.98.$
 Int. of \$1 for 33 days = \$.0055.
 $\$.98 - \$.0055 = \$.9745 ;$
 $\$19490 \div \$.9745 = \$20000, \text{ Ans}$
-

FOREIGN EXCHANGE.

(ART. 384, p. 260.)

- (2.) $\text{£}1 = \$4.80$
 $\text{£}2200 = \$4.80 \times 2200$
 $= \$10560, \text{ Ans.}$

- (3.) $\text{£}1 = \$4.82\frac{1}{4} = \4.8225 ;
 $\text{£}1173.25 = \$4.8225 \times 1173.25$
 $= \$5658$, Ans.
- (5.) $1 \text{ florin} = \$.40 \times 1.01 = \$.404$;
 $2626 \text{ florins} = \$.404 \times 2626 = \$1060.90+$, Ans.
- (7.) $\$500 \times 5.14 = 2570 \text{ francs}$, Ans.
- (8.) $\text{£} = \$4.82\frac{1}{4} = \4.8225 ;
 $\$5658 \div \$4.8225 = \text{£}1173.25 +$
 $= \text{£}1173 \text{ } 5 \text{ s.}$
-

REVIEW EXERCISES.

(PAGES 261, 262.)

- (1.) $6 \text{ weeks} = 42 \text{ days}$;
 $42 : 3 = 14$, Ans.
- (2.) $8 : 72 = \frac{8}{72} = \frac{1}{9}$, Ans.
- (3.) $31.65 \div 2.11 = 15$, Ans.
- (4.) $2.11 \times 15 = 31.65$, Ans.
- (5.) $2\frac{2}{3} \div \frac{2}{3} = 4\frac{2}{3} = 4\frac{4}{3}$, Ans.
- (6.) $9 : 10 = \frac{9}{10}$; $3 : 4 = \frac{3}{4}$;
 $\frac{9}{10} = \frac{18}{20}$; $\frac{3}{4} = \frac{15}{20}$. Therefore, $9 : 10$ is the greater.
- (7.) $(2 \times 5 \times 1) = 10 : (3 \times 7 \times 7) = 147$;
 $10 : 147$, Ans.

- (8.) $155 \times 5 = 775$ miles, Ans.
Or, $12 : 60 :: 155 \text{ miles} : 775 \text{ miles}$, Ans.
- (9.) $803 : 73 :: 22 \text{ days} : 2 \text{ days}$, Ans.
- (10.) The hound gains 2 leaps in making 27 leaps. Therefore
he will make as many times 27 leaps as 2 is found
times in 50 $= 25$;
And 25 times 27 $= 675$, Ans.
Or, as $2 : 50 :: 27 : 675$, Ans.
- (11.) $\$3000 + \$2000 + \$1000 = \6000 ;
 $\$6000 \times .12\frac{1}{2} = \750 .
A's share $= \frac{3000}{6000}$ or $\frac{1}{2}$ of $\$750 = \375 .
B's " $= \frac{2000}{6000}$ or $\frac{1}{3}$ of $\$750 = \250 .
C's " $= \frac{1000}{6000}$ or $\frac{1}{6}$ of $\$750 = \125 .
- (12.) $9 + 7 + 6 + 5 = 27$ letters.
Hendricks' share $= \frac{9}{27}$ or $\frac{1}{3}$ of $\$54000 = \18000 .
William's " $= \frac{7}{27}$ of $\$54000 = \14000 .
Arthur's " $= \frac{6}{27}$ of $\$54000 = \12000 .
Frank's " $= \frac{5}{27}$ of $\$54000 = \10000 .
- (13.) $3\frac{1}{2} : 9\frac{3}{4} :: \$7\frac{5}{8} : \$24.78+$, Ans.
 $\frac{3}{4} : \frac{7}{8}$
- (14.) $9000 \times 12 = 108000$
 $10000 \times 9 = \frac{90000}{198000}$
A's share $= \frac{108000}{198000}$ or $\frac{6}{11}$ of $\$1320 = \720 .
B's " $= \frac{90000}{198000}$ or $\frac{5}{11}$ of $\$1320 = \600 .

(15.)

$$4 \times 500 = 2000$$

$$8 \times 1000 = 8000$$

$$16 \times 1500 = 24000$$

$$\begin{array}{r} 3000 \overline{) 34000} \end{array}$$

$$11\frac{1}{2} \text{ months.}$$

$$11\frac{1}{2} \text{ months} = 11 \text{ mo. } 10 \text{ days, Ans.}$$

(16.)

| | | |
|---------|----------------------|---------|
| Int. of | \$400 for 231 days = | \$15.40 |
|---------|----------------------|---------|

| | | |
|-----|---------------|-------|
| “ “ | 1000 “ 60 “ = | 10.00 |
|-----|---------------|-------|

| | | |
|--|---------------|----------------|
| | <u>\$1400</u> | <u>\$25.40</u> |
|--|---------------|----------------|

$$\$1400 + \$25.40 = \$1425.40.$$

| | | |
|---------|----------------------|---------|
| Int. of | \$800 for 273 days = | \$36.40 |
|---------|----------------------|---------|

| | | |
|-----|---------------|-------|
| “ “ | 900 “ 123 “ = | 18.45 |
|-----|---------------|-------|

| | | |
|--|---------------|----------------|
| | <u>\$1700</u> | <u>\$54.85</u> |
|--|---------------|----------------|

$$\$1700 + \$54.85 = \$1754.85;$$

$$\$1754.85 - \$1425.40 = \$329.45, \text{ Ans.}$$

(17.)

$$\$1500 \div 75000 = .02;$$

$$\$1200 \times .02 = \$24, \text{ Ans.}$$

(18.)

$$15 \text{ shillings} = \frac{3}{4} \text{ of a } £;$$

$$\frac{3}{4} \text{ of } \$4.84 = \$3.63, \text{ cost of 1 yard in United States money.}$$

$$\$3.63 \times 500 = \$1815;$$

$$\$1815 \times .30 = \$544.50, \text{ Ans.}$$

(19.)

$$£ = \$4.86\frac{1}{2} = \$4.865;$$

$$\$2182.20 \div \$4.865 = £448.55 +$$

$$= £448 \text{ } 11 \text{ s, Ans.}$$

EXERCISES IN ANALYSIS.

(PAGES 202-206.)

- (2.) $\$735 \div 7 = \105 , Ans.
- (3.) B's share = $\frac{1}{7}$ of $\$1974 = \282 .
 A's " = $\frac{6}{7}$ of $\$1974 = \1692 .
- (5.) $\$60200 - \$35000 = \$25200$.
 A's share = $\frac{1}{3}$ of $\$25200 = \8400 ;
 B's " = $\frac{2}{3}$ of $\$25200 = \16800 ;
 C's " = $\frac{1}{3}$ of $\$25200 = \8400 .
- (6.) $\frac{1}{4} = \frac{3}{12}$; $\frac{1}{3} = \frac{4}{12}$; $\frac{1}{6} = \frac{2}{12}$; rem. = $\frac{8}{12}$.
 $\frac{3}{12} \times 2 = \frac{6}{12}$;
 $\frac{4}{12} \times 4 = \frac{16}{12}$;
 $\frac{2}{12} \times 5 = \frac{10}{12}$;
 $\frac{3}{12} \times 6 = \frac{18}{12}$;
 $\frac{6}{12} + \frac{16}{12} + \frac{10}{12} + \frac{18}{12} = \frac{50}{12}$;
 $\frac{50}{12} \div \frac{12}{12} = 4\frac{1}{3}$ mo. = 4 mo. 5 days, Ans.
- (8.) March 5, 1866, + 6 mo. = Sept. 5, 1866.
 $5 \text{ mo.} \times 200 = 1000 \text{ mo.}$;
 $1 \text{ " } \times 800 = \frac{800}{1000} \text{ "}$
 $\frac{800}{1000} \text{ "}$
 $\$1600 - \$1000 = \$600$;
 $\$1800 \div 600 = 3 \text{ months}$;
 Sept. 5 + 3 mo. = Dec. 5, 1866, Ans.
- (9.) $4 \text{ mo.} \times 1500 = 6000 \text{ months}$;
 $\$2500 - \$1500 = \$1000$;
 $6000 \div 1000 = 6 \text{ months}$, Ans.

- (11.) $19 \div 16 = 3$; $51 \div 3 = 17$;
 $19 \times 17 = 323$ miles, Ans.
- (12.) $2\frac{1}{4}$ miles $\times 2 = 4\frac{1}{2}$ miles A travels before B starts.
 9 miles $- 2\frac{1}{4}$ miles $= 6\frac{3}{4}$ miles B gains in 1 hour;
 $4\frac{1}{2} \div 6\frac{3}{4} = \frac{2}{3}$ hour $= 40$ minutes $=$ the time B will
overtake A.
 $\frac{2}{3}$ of 9 miles $= 6$ miles, distance from Boston.
- (14.) If 112 sheep are worth 90 colts, 9 colts, or 10 calves
 $= \frac{1}{10}$ of 112 sheep, 50 calves $= \frac{5}{10}$ of 112 sheep
 $= 56$ sheep, Ans.
- (15.) If 2 women can do the work of 3 boys, 1 woman can
do $\frac{1}{2}$ as much as 3 boys, 32 women, or 8 men, can
do $\frac{3}{2}$, or 16 times the work of 3 boys, or the
work of 48 boys, $\frac{1}{2}$ of 8 men would do the work
of 24 boys $= 4$ men, Ans.
- (16.) 1 cord of spruce $= \frac{1}{2}$ a cord of oak;
1 " " pine $= \frac{2}{3}$ of $\frac{1}{2}$ a cord of oak $= \frac{1}{3}$;
 $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$.
Therefore, 2 cords of spruce and pine in equal parts
 $= \frac{5}{3}$ cords of oak.
1 cord $= \frac{1}{2}$ of $\frac{5}{3} = \frac{2}{3}$; $60 \div \frac{2}{3} = 112$ cords, Ans.
- (18.) 1 man will do the work in 2 times $11\frac{1}{2}$ hours $=$
23 hours;
1 woman, in 5 times $11\frac{1}{2} = 57\frac{1}{2}$ hours;
1 boy, " 12 " $11\frac{1}{2} = 138$ "
In one hour a man do $\frac{1}{23}$;
A woman, $\frac{1}{57\frac{1}{2}} = \frac{2}{115}$; $\frac{2}{115} \times 2 = \frac{4}{115}$;
A boy, $\frac{1}{138} = \frac{1}{138}$; $\frac{1}{138} \times 3 = \frac{1}{46}$.
 $\frac{1}{23} + \frac{4}{115} + \frac{1}{46} = \frac{23}{230}$; $\frac{230}{23} \div \frac{23}{230} = 10$ hours, Ans

- (19.) The carpenter will do $\frac{1}{12\frac{1}{2}}$, or $\frac{2}{25}$ in one day = $\frac{2}{25}$;
 " journeyman " " $\frac{1}{18\frac{3}{4}}$, or $\frac{4}{75}$ " " " = $\frac{4}{75}$;
 " apprentice " " $\frac{1}{25}$ " " " = $\frac{2}{25}$;
 $\frac{2}{25} + \frac{4}{75} + \frac{2}{25} = \frac{12}{75}$, $\frac{12}{75} \div \frac{12}{75} = 5\frac{1}{3}$ days, the time
 they will do it together.
 The carpenter performs $\frac{2}{15}$ of what they all do in one
 day; hence,
 Carpenter will receive $\frac{2}{3}$ of \$325 = \$150.
 Journeyman " " $\frac{4}{3}$ " \$325 = \$100.
 Apprentice " " $\frac{2}{3}$ " \$325 = \$75.

EVOLUTION.

(ART. 393, p. 272.)

- (4.)
- $\begin{array}{r} 77841 \\ 4 \end{array} \overline{) 279, \text{ Ans.}}$

$$\begin{array}{r}
 40 \\
 \underline{7} \\
 47 \times 7 = 329 \\
 540 \\
 \underline{9} \\
 539 \times 9 = 4941
 \end{array}$$

- (5.)
- $\begin{array}{r} 291654 \\ 25 \end{array} \overline{) 54, \text{ Ans.}}$

$$\begin{array}{r}
 100 \\
 \underline{4} \\
 104 \times 4 = 416
 \end{array}$$

(6.) $10.4976\dot{3}.24$, Ans.

| | |
|------------------|-------------|
| 60 | 9 |
| <u>2</u> | 149 |
| $62 \times 2 =$ | <u>124</u> |
| 640 | 2576 |
| <u>4</u> | |
| $644 \times 4 =$ | <u>2576</u> |

(7.) $11664\dot{1}108$, Ans.

| | |
|------------------|-------------|
| 200 | 1 |
| <u>8</u> | 1664 |
| $208 \times 8 =$ | <u>1664</u> |

(8.) $.459684\dot{1}.678$, Ans.

| | |
|-------------------|--------------|
| 120 | 36 |
| <u>7</u> | 996 |
| $127 \times 7 =$ | 889 |
| 1340 | 10784 |
| <u>8</u> | |
| $1348 \times 8 =$ | <u>10784</u> |

(9.) $31640625\dot{5}5625$, Ans.

| | |
|--------------------|--------------|
| 100 | 25 |
| <u>6</u> | 664 |
| $106 \times 6 =$ | <u>636</u> |
| 1120 | 2806 |
| <u>2</u> | |
| $1122 \times 2 =$ | <u>2244</u> |
| 11240 | 56225 |
| <u>5</u> | |
| $11245 \times 5 =$ | <u>56225</u> |

(10.) $.000\dot{3}27248\dot{1} | .01809, \text{Ans.}$

| | | |
|-------------------|--------------|--|
| 20 | 1 | |
| <u>8</u> | 227 | |
| $28 \times 8 =$ | <u>224</u> | |
| 3600 | 32481 | |
| <u>9</u> | 32481 | |
| $3609 \times 9 =$ | <u>32481</u> | |

(11.) $.0000\dot{1}849 | .0048, \text{Ans.}$

| | | |
|-----------------|------------|--|
| 80 | 16 | |
| <u>3</u> | 249 | |
| $83 \times 3 =$ | <u>249</u> | |

(ART. 394, pp. 272, 273.)

(12.) $1\dot{2}.00000\dot{0} | 3.464+, \text{Ans}$

| | | |
|-------------------|--------------|--|
| 60 | 9 | |
| <u>4</u> | 300 | |
| $64 \times 4 =$ | <u>256</u> | |
| 680 | 4400 | |
| <u>6</u> | 4116 | |
| $686 \times 6 =$ | <u>4116</u> | |
| 6920 | 28400 | |
| <u>4</u> | 27696 | |
| $6924 \times 4 =$ | <u>27696</u> | |

(13.) $1.6\dot{0} | 1.26+, \text{Ans.}$

| | | |
|------------------|-------------|--|
| 20 | 1 | |
| <u>2</u> | 60 | |
| $22 \times 2 =$ | <u>44</u> | |
| 240 | 1600 | |
| <u>6</u> | 1476 | |
| $246 \times 6 =$ | <u>1476</u> | |

(14.)

$$\begin{array}{r}
 80 \\
 \underline{4} \\
 84 \times 4 = \\
 880 \\
 \underline{7} \\
 887 \times 7 =
 \end{array}
 \begin{array}{r}
 16 \\
 \hline
 400 \\
 336 \\
 \hline
 6400 \\
 6009 \\
 \hline
 \end{array}
 \begin{array}{l}
 .0020 \overline{) .0447 +, \text{Ans.}}
 \end{array}$$

(15.)

$$\begin{array}{r}
 40 \\
 \underline{2} \\
 42 \times 2 = \\
 440 \\
 \underline{3} \\
 443 \times 3 = \\
 4460 \\
 \underline{6} \\
 4466 \times 6 =
 \end{array}
 \begin{array}{r}
 4 \\
 \hline
 100 \\
 84 \\
 \hline
 1600 \\
 1329 \\
 \hline
 27100 \\
 26796 \\
 \hline
 \end{array}
 \begin{array}{l}
 5.00 \overline{) 2.236 +, \text{Ans.}}
 \end{array}$$

(16.)

$$\begin{array}{r}
 1400 \\
 \underline{7} \\
 1407 \times 7 = \\
 14140 \\
 \underline{1} \\
 14141 \times 1 =
 \end{array}
 \begin{array}{r}
 49 \\
 \hline
 10000 \\
 9849 \\
 \hline
 15100 \\
 14141 \\
 \hline
 \end{array}
 \begin{array}{l}
 .5000 \overline{) .7071 +, \text{Ans.}}
 \end{array}$$

(ART. 395, p. 273.)

(17.) $\sqrt{121} = 11$; $\sqrt{169} = 13$; $\frac{11}{13}$, Ans.

- (18.) $\frac{72\frac{3}{8}}{21\frac{6}{8}} = \frac{4\frac{3}{4}}{6\frac{3}{4}};$
 $\sqrt{49} = 7; \sqrt{64} = 8; \frac{7}{8}, \text{Ans.}$
- (19.) $\frac{450}{2048} = \frac{225}{1024};$
 $\sqrt{225} = 15; \sqrt{1024} = 32; \frac{15}{32}, \text{Ans.}$
- (20.) $37\frac{3}{8} = 18\frac{4}{8};$
 $\sqrt{1849} = 43; \sqrt{49} = 7; 4\frac{3}{7} = 6\frac{1}{7}, \text{Ans.}$
- (21.) $\frac{7}{8} = .875.$
 $\sqrt{.875} = .9354+, \text{Ans.}$
- (22.) $\sqrt{17.23} = 4.1509+, \text{Ans.}$
- (23.) $\begin{array}{r} 400 \\ 5 \\ \hline 405 \end{array} \times 5 = \begin{array}{r} 42025 \\ 4 \\ \hline 2025 \\ 2025 \\ \hline \end{array} 205, \text{Ans.}$
- (24.) $\sqrt{\frac{478}{549}} = \sqrt{.8706739526+} = .93309+, \text{Ans.}$

APPLICATIONS.

(PAGES 273, 274.)

- (1.) $\sqrt{3.61} = 19. \text{Ans.}$
- (2.) $\sqrt{20736} = 144, \text{Ans.}$
- (3.) $\sqrt{3969} = 63, \text{Ans.}$
- (4.) $\sqrt{141376} = 376, \text{Ans.}$
- (5.) 1 acre = 160 sq. rods.
 $\sqrt{160} = 12.64+ \text{rods, Ans.}$

- (6.) 10 acres = 1600 sq. rd.;
 $\sqrt{1600} = 40$, the length of one side;
 $40 \times 4 = 160 \times .60 = \96 , Ans.
- (7.) 1 hectare = 10000 meters;
 $\sqrt{10000} = 100$ meters, length of 1 side;
 4 sides = 4 times 100 meters = 400;
 $400 \times .25 = \$100$, Ans.
- (8.) $15410 - 34 = 15376$;
 $\sqrt{15376} = 124$, Ans.

CUBE ROOT.

(ART. 398, p. 278.)

- (3.)

| | |
|------|-------|
| 2700 | 54872 |
| 720 | 27 |
| 64 | 27872 |
| 3484 | 27872 |

 $\times 8 =$ 38, Ans.
- (4.)

| | |
|-------|--------|
| 19200 | 636056 |
| 1440 | 512 |
| 36 | 124056 |
| 20676 | 124056 |

 $\times 6 =$ 86, Ans.

(5.) $64\overline{964808}402$, Ans.

| | | |
|---------------------|----|---------------|
| 480000 | 64 | |
| 2400 | | 964808 |
| <u>4</u> | | |
| $482404 \times 2 =$ | | <u>964808</u> |

(5.) $444194.947\overline{76.3}$, Ans.

| | | |
|----------------------|-----|----------------|
| 14700 | 343 | |
| 1260 | | 101194 |
| <u>36</u> | | |
| $15996 \times 6 =$ | | <u>95976</u> |
| 1732800 | | 5218947 |
| 6840 | | |
| <u>9</u> | | |
| $1739649 \times 3 =$ | | <u>5218947</u> |

(7.) $.000001728\overline{.012}$, Ans.

| | | |
|------------------|---|------------|
| 300 | 1 | |
| 60 | | 728 |
| <u>4</u> | | |
| $364 \times 2 =$ | | <u>728</u> |

(8.) $.001906624\overline{.124}$, Ans.

| | | |
|--------------------|---|---------------|
| 300 | 1 | |
| 60 | | 906 |
| <u>4</u> | | |
| $364 \times 2 =$ | | <u>728</u> |
| 43200 | | 178624 |
| 1440 | | |
| <u>16</u> | | |
| $44656 \times 4 =$ | | <u>178624</u> |

(9.) $107\bar{6}890\bar{6}25 \mid 1025, \text{Ans.}$

| | |
|----------------------|-----------------|
| 30000 | 1 |
| 600 | 76890 |
| <u>4</u> | |
| $30604 \times 2 =$ | 61208 |
| 3121200 | <u>15682625</u> |
| 15300 | |
| <u>25</u> | |
| $3136525 \times 5 =$ | <u>15682625</u> |

(10.) $80.677568161 \mid 4.321, \text{Ans.}$

| | |
|-----------------------|-----------------|
| 4800 | 64 |
| 360 | 16677 |
| <u>9</u> | |
| $5169 \times 3 =$ | 15507 |
| 554700 | <u>1170568</u> |
| 2580 | |
| <u>4</u> | |
| $557284 \times 2 =$ | 1114568 |
| 55987200 | <u>56000161</u> |
| 12960 | |
| <u>1</u> | |
| $56000161 \times 1 =$ | <u>56000161</u> |

(ART. 399, pp. 278, 279.)

(11.) $26.200 \mid 2.97+, \text{Ans.}$

| | |
|---------------------|----------------|
| 1200 | 8 |
| 540 | 18200 |
| <u>81</u> | |
| $1821 \times 9 =$ | 16389 |
| 252300 | <u>1811000</u> |
| 6090 | |
| <u>49</u> | |
| $258439 \times 7 =$ | <u>1809073</u> |

(12.) $\dot{2}.000\dot{1}1.259+$, Ans.

| | |
|----------------------|-----------------|
| 300 | 1 |
| 60 | 1000 |
| <u>4</u> | |
| $364 \times 2 =$ | <u>728</u> |
| 43200 | 272000 |
| 1800 | |
| <u>25</u> | |
| $45025 \times 5 =$ | <u>225125</u> |
| 4687500 | 46875000 |
| 33750 | |
| <u>81</u> | |
| $4721331 \times 9 =$ | <u>42491979</u> |

(13.) $517.000\dot{8}.025+$, Ans

| | |
|------------------------|------------------|
| 1920000 | 512 |
| 4800 | 5000000 |
| <u>4</u> | |
| $1924804 \times 2 =$ | <u>3849608</u> |
| 192961200 | 1151392000 |
| 120300 | |
| <u>25</u> | |
| $193081525 \times 5 =$ | <u>965407625</u> |

(ART. 400, p. 279.)

(14.) $\frac{189}{875} = \frac{27}{125}$;
 $\sqrt[3]{27} = 3$; $\sqrt[3]{125} = 5$. Ans., $\frac{3}{5}$.(15.) $\frac{4}{9} = 44444444+$;
 $\sqrt[9]{44444444} = .763+$, Ans.

-) $\frac{136}{12393} = \frac{8}{729}$;
 $\sqrt[3]{8} = 2$; $\sqrt[3]{729} = 9$. Ans., $\frac{2}{9}$.
-) $\frac{8}{9} = .857142857+$;
 $\sqrt[3]{857142857} = .949+$, Ans.
-) $302\frac{85}{125} = 156\frac{25}{125}$;
 $\sqrt[3]{15625} = 25$; $\sqrt[3]{512} = 8$; $2\frac{5}{8} = 3\frac{1}{8}$, Ans.
-) $7\frac{3}{8} = 7.6$;
 $\sqrt[3]{7.6} = 1.966+$, Ans.
-) $105\frac{28}{125} = 506\frac{53}{125}$;
 $\sqrt[3]{50653} = 37$; $\sqrt[3]{125} = 5$; $3\frac{7}{5} = 7\frac{3}{5}$, Ans.
-) $15.320\overline{)2.483+}$, Ans.
- | | |
|----------------------|----------------|
| 1200 | 8 |
| 240 | 7320 |
| 16 | |
| <hr/> 1456 × 4 = | <hr/> 5824 |
| 172800 | 1496000 |
| 5760 | |
| 64 | |
| <hr/> 178624 × 8 = | <hr/> 1428992 |
| 18451200 | 67008000 |
| 22320 | |
| 9 | |
| <hr/> 18473529 × 3 = | <hr/> 55420587 |

(PAGE 279.)

-) $\sqrt[3]{103823} = 47$ in., Ans.
-) $\sqrt[3]{2150.42} = 12.9+$, in., Ans.

- (3.) $21\frac{1}{2} \times 6 \times 4 = 512 \text{ cu. ft.};$
 $\sqrt[3]{512} = 8 \text{ ft., Ans.}$
- (4.) $474552 \text{ liters} = 474.552 \text{ cu. meters};$
 $\sqrt[3]{474.552} = 7.8 \text{ meters};$
 $(7.8)^2 = 60.84 \text{ sq. meters} = \text{area of 1 side, Ans.}$
- (5.) $\sqrt[3]{1331} = 11 \text{ ft., Ans.}$
- (6.) $576 \times 231 = 133056 \text{ cu. in.};$
 $133056 \div 1728 = 77 \text{ cu. ft.};$
 $\sqrt[3]{77} = 4.25+, \text{ Ans.}$
-

MENSURATION.

(ART. 411, p. 283.)

- (3.) $15^2 = 225;$
 $20^2 = 400;$
 $225 + 400 = 625;$
 $\sqrt{625} = 25 \text{ ft., Ans.}$
- (4.) $60^2 = 3600;$
 $80^2 = 6400;$
 $3600 + 6400 = 10000;$
 $\sqrt{10000} = 100 \text{ miles, Ans.}$
- (5.) $36^2 = 1296;$
 $24^2 = 576;$
 $1296 - 576 = 720 \text{ meters};$
 $\sqrt{720} = 26.83+ \text{ meters, Ans.}$

- (6.) $30^2 = 900$;
 $40^2 = 1600$;
 $1600 + 900 = 2500$;
 $\sqrt{2500} = 50$ ft.;
 30 ft. + 50 ft. = 80 ft. high of the tree, **Ans.**
- (7.) $25^2 = 625$;
 $15^2 = 225$;
 $625 - 225 = 400$;
 $\sqrt{400} = 20$; $20 \times 2 = 40$ ft., width of house, **Ans.**

(ART. 416, p. 286.)

- (1.) $18.8 \times 2.7 = 50.76$ sq. ft., **Ans.**
- (2.) 15 in. = $2\frac{1}{4}$ ft.;
 $28 \times 2\frac{1}{4} = 35$ ft., **Ans.**
- (3.) $40 \div 2 = 20$ ft.;
 $20 \times 20 = 400$ sq. ft., **Ans.**
- (4.) $32 \div 2 = 16$;
 $16 \times 14 = 224$ sq. rd. = 1 A. 64 sq. rd., **Ans.**
- (5.) $75 + 33 = 108$;
 $108 \div 2 = 54$;
 $54 \times 20 = 1080$ sq. yd. =
 $1080 \div 30\frac{1}{4} = 35.7 +$ sq. rd., **Ans.**
- (6.) $640 \times 240 = 153600$ sq. meters;
 $153600 \div 10000 = 15.36$ hectares =
 15 hectares, 36 ares, **Ans.**
- (7.) $160 \div 2 = 80$;
 $50 \times 80 = 4000$;
 $70 \times 80 = 5600$;
 $4000 + 5600 = 9600$ sq. rd. = 60 A., **Ans.**

(ART. 417, p. 286.)

$$\begin{aligned}
 (8.) \quad & 13 + 84 + 85 = 182; \\
 & 182 \div 2 = 91; \\
 & 91 - 13 = 78; \\
 & 91 - 84 = 7; \\
 & 91 - 85 = 6; \\
 & 91 \times 78 \times 7 \times 6 = 298116 \text{ rd.}; \\
 & \sqrt{298116} = 546 \text{ sq. rd.} = 3 \text{ A. } 66 \text{ sq. rd., Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (9.) \quad & 30 + 35 + 45 = 110; \\
 & 110 \div 2 = 55; \\
 & 55 - 30 = 25; \\
 & 55 - 35 = 20; \\
 & 55 - 45 = 10; \\
 & 55 \times 25 \times 20 \times 10 = 275000 \text{ rd.}; \\
 & \sqrt{275000} = 524.4, \text{ area of one triangle.} \\
 & 25 + 45 + 40 = 110; \\
 & 110 \div 2 = 55; \\
 & 55 - 25 = 30; \\
 & 55 - 45 = 10; \\
 & 55 - 40 = 15; \\
 & 55 \times 30 \times 10 \times 15 = 497.4, \text{ area of other triangle} \\
 & 524.4 + 497.4 = 1021.8 \text{ sq. rd.}; \\
 & 1021.8 \div 160 = 6 \text{ A. } 61.8 \text{ sq. rd., Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (10.) \quad & 14.6 \times 6 = 87.6 \text{ ft.}; \\
 & 12.64 \div 2 = 6.32 \text{ ft.}; \\
 & 87.6 \times 6.32 = 553.63 + \text{ sq. ft., Ans.}
 \end{aligned}$$

(ART. 420, pp. 288, 289.)

$$\begin{aligned}
 (1.) \quad & 20 \times 3.1416 = 62.83 + \text{ ft., Ans.} \\
 (2.) \quad & 142 \div 3.1416 = 45.19 \text{ yd., Ans.}
 \end{aligned}$$

- (3.) $100^2 = 10000$;
 $10000 \times .7854 = 7854$ sq. yd., Ans.
- (4.) $24^2 = 576$; $576 \div 2 = 288$;
 $\sqrt{288} = 16.97$ in., Ans.
- (5.) $5 \times 3.1416 = 15.7+$ ft., Ans.
- (6.) 5 A. 146 sq. rd. $= 946$ sq. rd. ;
 $946 \div .7854 = 1204.48+$ sq. rd. ;
 $\sqrt{1204.48} = 34.7+$ rd., Ans.
- (7.) $50^2 = 2500$; $2500 \times .7854 = 1963.5$ sq. meters
 $= 19$ ares, 63.5 centiares, Ans.
- (8.) $50 \times .8862 = 44.31$ ft., Ans.
- (9.) 1 A. $= 160$ sq. rd. ;
 $160 \div .7854 = 203.71+$ sq. rd. ;
 $\sqrt{203.71} = 14.27+$ rd., diameter of the circle ;
 $1427 \div 2 = 7.136+$ rd., length of tether, Ans.
- (10.) $300 \times .2251 = 67.53+$ in., Ans.
- (11.) 2 A. $= 320$ sq. rd. ;
 $320 \div .7854 = 471.09$ sq. rd. ;
 $\sqrt{471.09} = 21.7$ rd. $\div 2 = 10.8+$ rd., Ans

(ART. 423, p. 290.)

- (2.) $4 \times 3.1416 = 12.5664$;
 $12.5664 \times 10 = 125.66+$ sq. ft., Ans.
- (3.) $90^2 = 8100$;
 $8100 \times .7854 = 6361.74$ sq. centimeters $=$
 $.636174$ sq. meters ;
 $.636174 + 10 = 6.36174$ cubic meters, Ans.

- (4.) $2 + 2 + 2 = 6$; $6 \div 2 = 3$;
 $3 - 2 = 1$;
 $3 - 2 = 1$;
 $3 - 2 = 1$;
 $3 \times 1 \times 1 \times 1 = 3$;
 $\sqrt{3} = 1.73+$;
 $1.73 \times 14 = 24.22+$ in., Ans.
- (5.) $1 \text{ ft. } 5 \text{ in.} \times 17 \text{ in.}$;
 $17 \times 6\frac{1}{2} = 110\frac{1}{2} \text{ sq. in.} = \frac{110\frac{1}{2}}{144} \text{ ft.}$;
 $\frac{110\frac{1}{2}}{144} \times 22\frac{7}{8} = 17.329 \text{ cu. ft., Ans.}$

(ART. 427, pp. 292, 293.)

- (1.) $3 \times 4 = 12$;
 $24.05 \div 2 = 12.025$;
 $12 \times 12.025 = 144.3$, convex surface.
 $3 \times 3 = 9 = \text{end surface.}$
 $144.3 + 9 = 153.3$, entire surface, Ans.
- (2.) $20 \div 2 = 10$; $60 \times 10 = 600 \text{ sq. ft.} = 66\frac{2}{3} \text{ sq. yd.,}$
 Ans.
- (3.) $15 \times 3 = 45 \div 2 = 22\frac{1}{2}$;
 $22\frac{1}{2} - 15 = 7\frac{1}{2}$;
 $7\frac{1}{2} \times 7\frac{1}{2} \times 7\frac{1}{2} \times 22\frac{1}{2} = 9492.18$;
 $\sqrt{9492.18} = 97.42 \text{ sq. decimeters, surface of larger}$
 end.
 $9 \times 3 = 27$; $27 \div 2 = 13\frac{1}{2}$;
 $13\frac{1}{2} - 9 = 4\frac{1}{2}$;
 $4\frac{1}{2} \times 4\frac{1}{2} \times 4\frac{1}{2} \times 13\frac{1}{2} = 1230.18$;
 $\sqrt{1230.18} = 35.07 \text{ sq. decimeters, surface of smaller}$
 end.

$$15 \times 3 = 45;$$

$$9 \times 3 = 27;$$

$$45 + 27 = 72; 72 \div 2 = 36;$$

$$36 \times 12 = 432 \text{ sq. decimeters, convex surface};$$

$$97.42 + 35.07 + 432 = 564.49 \text{ sq. decimeters, = } \\ 5.6449 \text{ sq. meters, entire surface, Ans.}$$

(4.) $720 \div 2 = 360; 360^2 = 129600;$
 $477^2 = 227529 - 129600 = 97929;$
 $\sqrt{97929} = 313 \text{ nearly}; 313 \div 3 = 104\frac{1}{3};$
 $720^2 = 518400 \times 104\frac{1}{3} = 54086400;$
 $54086400 \div 27 = 2003200 \text{ cu. yd., Ans.}$

(5.) $9.5 \times 9.5 \times .7854 = 70.882+$, area of the base;
 $70.882+ \times 2\frac{1}{3} = 496.176+$ cu. feet, Ans.

(6.) $30 \times 30 \times .7854 = 706.86$, area of larger end.
 $18 \times 18 \times .7854 = 254.46+$, area of smaller end.
 $706.86 \times 254.46 = 179867.59+$;
 $\sqrt{179867.59} = 424.1;$
 $706.86 + 254.46 + 424.1 = 1385.42 \text{ sq. in. = } \\ 9.62 \text{ sq. ft.};$
 $9.62 \times 15 = 144.3+$ cu. ft., Ans.

(7.) $27^2 = 729 \text{ in., area of larger end.}$
 $16^2 = 256 \text{ " " " smaller "}$
 $729 \times 256 = 186624;$
 $\sqrt{186624} = 432.$
 $729 + 256 + 432 = 1417 \text{ sq. in. = } 9.84+ \text{ sq. ft.};$
 $9.84 \times 6\frac{2}{3} = 61.22+$ cu. ft., Ans.

(ART. 430, p. 294.)

(1.) $9^2 \times 3.1416 = 254.46+$ sq. in., Ans.

- (2.) $3.1416 \div 6 = .5236$;
 $.5236 \times 12^3 = 904.78$ cu. centimeters =
 .000904780 cu. meters, Ans.
- (3.) $.5236 \times 15^3 = 1767.15$ cu. in., Ans.
- (4.) $3.1416 \times 7912^3 = 196663355.75+$ sq. in., Ans.

(ART. 431, p. 295.)

- (2.) $12^3 : 15^3 :: 113.09 : 176.70$ sq. ft., Ans.
- (3.) $40^3 : 30^3 :: \$125 : \$70.31\frac{1}{4}$, Ans.
- (4.) $\sqrt{1000} : \sqrt{900} :: 40 : 37.947+$, Ans.
- (5.) $8^3 : 9^3 :: 36 : 51.25+$ kilos., Ans.
- (6.) $\$6 : \$10368 :: 1^3 : 1728$;
 $\sqrt[3]{1728} = 12$ in., Ans.
- (7.) $1 : \frac{1}{2} :: (18\frac{1}{2})^3 : 3165.812$;
 $\sqrt[3]{3165.812} = 14.68+$ in., Ans.
- (8.) $1 : 3 :: 2^3 : 24$;
 $\sqrt[3]{24} = 2.88+$ ft., Ans.
- (9.) $30^3 : 20^3 :: 11\frac{1}{4}$ minutes : 5 minutes, Ans.
- (10.) $1 : \frac{1}{8} :: 16^3 : 512$;
 $\sqrt[3]{512} = 8$ ft., Ans.

(ART. 433, p. 296.)

- (1.) 16 in. = $1\frac{1}{3}$ ft. ;
 $20 \times 1\frac{1}{3} = 26\frac{2}{3}$ sq. ft., Ans.

- (2.) $18 \text{ in.} = 1\frac{1}{2} \text{ ft.};$
 $16 \times 1\frac{1}{2} \times 3 \times 2 = 144 \text{ sq. ft., Ans.}$
- (3.) $4 \text{ in.} = \frac{1}{3} \text{ of a ft.};$
 $14 \times \frac{1}{3} \times 4 \times 6 = 112 \text{ sq. ft., Ans.}$
- (4.) $10 \text{ in.} = \frac{5}{8} \text{ of a ft.};$
 $24 \times \frac{5}{8} \times 6 \times .03 = \$3.60, \text{ Ans.}$
- (5.) $16 + 20 = 36; 36 \div 2 = 18 \text{ in.} = 1\frac{1}{2} \text{ ft.};$
 $22 \times 1\frac{1}{2} \times 3\frac{1}{2} = 115\frac{1}{2} \text{ sq. ft., Ans.}$
-

GAUGING.

(ART. 435, p. 297.)

- (1.) $18^2 \times 30 \times .0034 = 33+ \text{ gallons, Ans.}$
- (2.) $22 - 16 = 6; \frac{2}{3} \text{ of } 6 = 4;$
 $(16 + 4)^2 \times 36 \times .0034 = 48.96, \text{ Ans.}$
- (3.) $36 - 32 = 4; \frac{2}{3} \text{ of } 4 = 2\frac{2}{3};$
 $32 + 2\frac{2}{3} = 34\frac{2}{3};$
 $(34\frac{2}{3})^2 \times 60 \times .0034 = 245.146+ \text{ gal., Ans.}$
- (4.) $60 \times 60 = 3600 \text{ sq. centimeters} =$
 $.36 \text{ sq. meters};$
 $.7854 \times .36 = .282744 \text{ sq. meters};$
 $.282744 \times 1 \times 1000 = 282.744+ \text{ liters, Ans.}$

MEDIAL PROPORTION.

(ART. 437, p. 298.)

$$\begin{array}{rcl}
 (2.) & \$50 \times 8 & = \$4.00 \\
 & .65 \times 12 & = 7.80 \\
 & .60 \times 10 & = 6.00 \\
 & 30) & \underline{\$17.80} \\
 & & \$59\frac{1}{3}, \text{ Ans.}
 \end{array}$$

$$\begin{array}{rcl}
 (3.) & \$1.00 \times 18 & = \$18.00 \\
 & .60 \times 6 & = 3.60 \\
 & 1.20 \times 6 & = 7.20 \\
 & 30) & \underline{\$28.80} \\
 & & \$96, \text{ Ans.}
 \end{array}$$

(ART. 438, p. 300.)

$$(2.) \quad 16 \text{ c. } \left\{ \begin{array}{l} 10 \text{ c., to gain 1 c. take } \frac{1}{6} \text{ lb.} \\ 14 \text{ c., " " " " } \frac{1}{2} \text{ lb.} \\ 17 \text{ c., " lose " " } 1 \text{ lb.} \\ 18 \text{ c., " " " " } \frac{1}{2} \text{ lb.} \end{array} \right\} \times 6 = \left\{ \begin{array}{l} 1 \text{ lb.} \\ 3 \text{ lb.} \\ 6 \text{ lb.} \\ 3 \text{ lb.} \end{array} \right.$$

$$(3.) \quad 7 \text{ c. } \left\{ \begin{array}{l} 4 \text{ c., to gain 1 c. take } \frac{1}{3} \text{ lb.} \\ 6 \text{ c., " " " " } 1 \text{ lb.} \\ 11 \text{ c., " lose 1 + 1 c. " } \frac{1}{2} \text{ lb.} \end{array} \right\} \times 6 = \left\{ \begin{array}{l} 2 \text{ lb.} \\ 6 \text{ lb.} \\ 3 \text{ lb.} \end{array} \right.$$

Or,

$$7 \text{ c. } \left\{ \begin{array}{l} 4 \text{ c., to gain 3 c. take 1 lb.} \\ 6 \text{ c., " " 1 c. " } 1 \text{ lb.} \\ 11 \text{ c., " lose 4 c. " } 1 \text{ lb.} \end{array} \right.$$

$$(4.) \quad \$4 \left\{ \begin{array}{l} \$3, \text{ to gain } \$1 \text{ take 1 gal.} \\ \$5, \text{ " lose " " } 1 \text{ gal.} \\ \$7, \text{ " " " " } \frac{1}{3} \text{ gal.} \\ \$0, \text{ " gain " " } \frac{1}{3} \text{ gal.} \end{array} \right\} \times 12 = \left\{ \begin{array}{l} 4 \text{ gal.} \\ 3 \text{ gal.} \end{array} \right.$$

$$(5.) \quad \$8 \left\{ \begin{array}{l} \$6, \text{ to gain } \$1 + \$1 \text{ take 1 pig} \\ \$9, \text{ " lose } \$1 \quad \quad \quad \text{" 1 sheep} \\ \$10, \text{ " " } \$1 \quad \quad \quad \text{" } \frac{1}{2} \text{ colt} \end{array} \right\} \times 2 = \left\{ \begin{array}{l} 2 \text{ pigs.} \\ 2 \text{ sheep.} \\ 1 \text{ colt.} \end{array} \right.$$

(ART. 439, p. 301.)

$$(2.) \quad 12 \text{ c.} \left\{ \begin{array}{l} 9 \text{ c., to gain 1 c. take } \frac{1}{3} \text{ lb.} \\ 10 \text{ c., " " " " } \frac{1}{2} \text{ lb.} \\ 13 \text{ c., " lose " " 1 lb.} \\ 14 \text{ c., " " " " } \frac{1}{2} \text{ lb.} \end{array} \right\} \times 60 = \left\{ \begin{array}{l} 20 \text{ lb.} \\ 30 \text{ lb.} \\ 60 \text{ lb.} \\ 30 \text{ lb.} \end{array} \right.$$

$$30 \div \frac{1}{2} = 60.$$

$$(3.) \quad 75 \text{ c.} \left\{ \begin{array}{l} 90 \text{ c., to lose 1 c. take } \frac{1}{15} \text{ lt.} \\ 0 \text{ c., " gain " " } \frac{1}{75} \text{ lt.} \end{array} \right\} \times 750 = \left\{ \begin{array}{l} 50 \text{ lt.} \\ 10 \text{ lt.} \end{array} \right.$$

$$50 \div \frac{1}{15} = 750.$$

$$(5.) \quad \$70 \left\{ \begin{array}{l} \$60, \text{ to gain } \$1 \text{ take } \frac{1}{10} \text{ of a cow} \\ \$80, \text{ " lose " " } \frac{1}{10} \text{ of a cow} \\ \$40, \text{ " gain " " } \frac{1}{30} \text{ of a cow} \\ \$100, \text{ " lose " " } \frac{1}{30} \text{ of a cow} \end{array} \right\} \times 900 = \left\{ \begin{array}{l} 1 \text{ cow.} \\ 1 \text{ cow.} \\ 30 \text{ cows.} \\ 30 \text{ cows.} \end{array} \right.$$

$$30 \div \frac{1}{30} = 900.$$

It is evident, from the operation, that any same number of each of the \$60 and \$80 kinds may have been taken; hence, there may have been sold 30 each of the several kinds.

(ART. 440, p. 302.)

$$(2.) \quad 88 \text{ c.} \left\{ \begin{array}{l} 96 \text{ c., to lose 1 c. take } \frac{1}{8} \text{ lb.} \\ 90 \text{ c., " " " " } \frac{1}{2} \text{ lb.} \\ 78 \text{ c., " gain 1 + 1 c. " } \frac{1}{5} \text{ lb.} \end{array} \right\} \times 44\frac{2}{3} = \left\{ \begin{array}{l} 16\frac{2}{3} \\ 67\frac{2}{3} \\ 27\frac{2}{3} \end{array} \right.$$

$$\frac{1}{8} + \frac{1}{2} + \frac{1}{5} = \frac{23}{40}; 112 \div \frac{23}{40} = 44\frac{2}{3}.$$

$$(3.) \quad 50 \text{ c.} \left\{ \begin{array}{l} 40 \text{ c., to gain 2 c. take } \frac{1}{5} \text{ lb.} \\ 60 \text{ c., " lose 1 c. " } \frac{1}{10} \text{ lb.} \\ 70 \text{ c., " " " " } \frac{1}{20} \text{ lb.} \end{array} \right\} \times 114\frac{2}{3} = \left\{ \begin{array}{l} 22\frac{2}{3} \\ 11\frac{2}{3} \\ 5\frac{2}{3} \end{array} \right.$$

$$\frac{1}{5} + \frac{1}{10} + \frac{1}{20} = \frac{7}{20}; 40 \div \frac{7}{20} = 114\frac{2}{3}.$$

$$(4.) \quad 20 \text{ ca.} \left\{ \begin{array}{l} 18 \text{ ca., to gain 1 ca. take } \frac{1}{2} \text{ lb.} \\ 19 \text{ ca., " " " " 1 lb.} \\ 24 \text{ ca., " lose 2 ca. " } \frac{1}{2} \text{ lb.} \end{array} \right\} \times \frac{1}{2} = \left\{ \begin{array}{l} \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \end{array} \right.$$

$$\frac{1}{2} + 1 + \frac{1}{2} = 2; 1 \div 2 = \frac{1}{2}.$$

$$(5.) \quad 9 \text{ c.} \left\{ \begin{array}{l} 7 \text{ c., to gain 1 c. take } \frac{1}{2} \text{ lb.} \\ 8 \text{ c., " " " " 1 lb.} \\ 10 \text{ c., " lose " " 1 lb.} \\ 11 \text{ c., " " " " } \frac{1}{2} \text{ lb.} \end{array} \right\} \times 30 = \left\{ \begin{array}{l} 15 \text{ lb.} \\ 30 \text{ lb.} \\ 30 \text{ lb.} \\ 15 \text{ lb.} \end{array} \right.$$

$$\frac{1}{2} + 1 + 1 + \frac{1}{2} = 3; 90 \div 3 = 30.$$

$$(6.) \quad 270 \text{ c.} \left\{ \begin{array}{l} 260 \text{ c., to gain 1 c. take } \frac{1}{10} \text{ gal.} \\ 280 \text{ c., " lose " " } \frac{1}{10} \text{ gal.} \\ 240 \text{ c., " gain 1 c. " } \frac{1}{30} \text{ gal.} \\ 290 \text{ c., " lose " " } \frac{1}{20} \text{ gal.} \end{array} \right\} \times 10 = \left\{ \begin{array}{l} 1 \text{ gal.} \\ 1 \text{ gal.} \\ 2 \text{ gal.} \\ 3 \text{ gal.} \end{array} \right\} \times 9 = \left\{ \begin{array}{l} 9 \text{ gal.} \\ 9 \text{ gal.} \\ 18 \text{ gal.} \\ 27 \text{ gal.} \end{array} \right.$$

$$1 + 1 + 2 + 3 = 7; 63 \div 7 = 9.$$

ARITHMETICAL SERIES.

(ART. 445, p. 304.)

- (1.) $2 \times 4 = 8;$
 $15 + 8 = 23$ years, age of oldest, Ans.
- (2.) $\frac{1}{3} \times 32 = 10\frac{2}{3};$
 $12 + 10\frac{2}{3} = 22\frac{2}{3}$ cts., Ans.
- (3.) $3 \times 39 = 117;$
 $1.80 - 1.17 = .63$ cts., Ans.

(ART. 446, pp. 304, 305.)

$$(1.) \quad \frac{27\frac{1}{2} - 5}{11 - 1} = 2\frac{1}{4}, \text{ Ans.}$$

$$(2.) \quad \frac{27\frac{1}{2} - 5}{2\frac{1}{4}} + 1 = 11, \text{ Ans.}$$

$$(3.) \quad \frac{58 - 3}{5} + 1 = 12 \text{ days, Ans.}$$

(ART. 447, p. 305.)

$$(1.) \quad 24 + 1 = 25; 25 \times 24 = 600;$$

$$600 \div 2 = 300, \text{ Ans.}$$

$$(2.) \quad \frac{1}{4} \times 29 = 7\frac{1}{4};$$

$$30 - 7\frac{1}{4} = 22\frac{3}{4}, \text{ the distance traveled the thirtieth day.}$$

$$30 + 22\frac{3}{4} = 52\frac{3}{4}; 52\frac{3}{4} \times 30 = 1582\frac{1}{2};$$

$$1582\frac{1}{2} \div 2 = 791\frac{1}{4} \text{ miles, Ans.}$$

$$(3.) \quad 200 + 2 = 202; 202 \times 100 = 20200;$$

$$20200 \div 2 = 10100 \text{ yd.} = 5 \text{ m. } 1300 \text{ yd., Ans.}$$

GEOMETRICAL SERIES.

(ART. 449, p. 306.)

$$(1.) \quad 2^7 = 128; 128 \times 6 = 768, \text{ Ans.}$$

$$(2.) \quad (\frac{1}{4})^5 = \frac{1}{1024}; 4096 \times \frac{1}{1024} = 4, \text{ Ans.}$$

$$(3.) \quad (1\frac{1}{2})^{10} = \frac{59049}{1024};$$

$$1024 \times \frac{59049}{1024} = \$59049, \text{ Ans.}$$

(ART. 450, p. 307.)

$$(1.) \quad 768 \div 6 = 128;$$

$$\sqrt[7]{128} = 2, \text{ Ans.}$$

$$(2.) \quad 4 \div 4096 = \frac{1}{1024};$$

$$\sqrt[5]{\frac{4}{1024}} = \frac{1}{4}, \text{ Ans.}$$

$$(3.) \quad 6144 \div 3 = 2048;$$

$$\sqrt[11]{2048} = 2, \text{ Ans.}$$

(ART. 451, p. 307.)

$$(1.) \quad 128 \times 4 = 512; 512 - 2 = 510;$$

$$110 \div 3 = 170, \text{ Ans.}$$

$$(2.) \quad 2 = \text{the rate};$$

$$12 = \text{No. of terms};$$

$$2^{11} = 2048;$$

$$2048 \times 101 = 206848 = \text{last term};$$

$$206848 \times 2 = 413696;$$

$$413696 - 101 = 413595; 413595 \div 1 = 413595, \text{ Ans}$$

$$(3.) \quad 3^{11} = 177147; 177147 \times 1 = 177147 = \text{last term};$$

$$177147 \times 3 = 531441; 531441 - 1 = 531440;$$

$$531440 \div 2 = \$265720, \text{ Ans.}$$

ANNUITIES.

(ART. 455, p. 309.)

$$2.) \quad \text{The amount of \$200 for 7 years at 6 \%} = \$284 =$$

last term of the series;

$$\$284 + \$200 = \$484; \$484 \times 4 = \$1936, \text{ Ans.}$$

- .) $\$450 \div 4 = \112.50 ;
 The amount of $\$112.50$ for 10 years and 9 months =
 $\$185.06\frac{1}{4}$ = last term of the series.
 $\$185.06\frac{1}{4} + \$112.50 = \$297.56\frac{1}{4}$;
 $\$297.56\frac{1}{4} \times 22 = \$6546.37\frac{1}{2}$,
- .) Amount of $\$450$ for 9 years at 7 % = $\$733.50$ =
 last term of the series;
 $\$733.50 + \$450 = \$1183.50$;
 $\$1183.50 \times 5 = 5917.50$, Ans.

(ART. 456, pp. 309, 310.)

- .) The amount of $\$200$ for 4 years at 7 % compound
 interest = $\$262.1592$;
 $\$262.1592 \times 1.07 = \$280.5103+$;
 $\$280.5103 - \$200 = \$80.5103$; $\$80.5103 \div .07 =$
 $\$1150.146+$, Ans.
- .) By the table, page 228, the amount of $\$1$ at com-
 pound interest for 20 years at 7 % is $\$3.869685$,
 and for 9 years is $\$1.838459$;
 $\$3.869685 \times 1.838459 = \$7.1142+$;
 $\$7.1142 \times 40 = \$284.568+$;
 $\$284.568 \times 1.07 = \$304.4877+$;
 $\$304.4877 - \$40 = \$264.4877+$;
 $\$264.4877 \div .07 = \$3778.39+$, Ans.
- .) By the table, the amount of $\$1$ at 3 % compound
 interest for 20 years = $\$1.806111$, and for 9
 years = $\$1.304773$;
 $\$1.806111 \times 1.806111 \times 1.304773 = \$4.256+$;
 $\$4.256+ \times 50 = \212.80 = amount of $\$50$ for 49
 deposits;
 $\$212.81 \times 1.03 = \$219.1943+$; $\$219.1943 - \$50 =$
 $\$169.1943$;
 $\$169.1943 \div .03 = \5639.81 , Ans.

(ART. 457, p. 310.)

- (2.) The amount of an annuity of \$1000 for 4 years at 7 %
= 4439.943.

The amount of \$1 for 4 years at 7 % = \$1.310796;
\$4439.943 \div 1.310796 = \$3387.207+, Ans.

- (3.) The amount of an annuity of \$154 for 19 years at
5 % compound interest = \$4703; and the amount
of \$1 at compound interest for 19 years =
\$2.52695;

\$4703 \div 2.52695 = \$1861.13, Ans.

- (4.) 30000 \div 5000 = 6, the number of years of the an-
nuity.

The amount of an annuity of \$5000 for 6 years at
6 % compound interest = \$34876.5416+.

The amount of \$1 at 6 % compound interest =
\$1.418519.

\$34876.5416+ \div \$1.418519 = \$24586.62, Ans.

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REVIEW EXERCISES.

(PAGES 310, 311.)

- (1.) $11\frac{2}{5} = \frac{57}{5}$;
 $\frac{57}{5} \times \frac{57}{5} \times \frac{57}{5} = \frac{185193}{125} = 1481\frac{68}{125}$, Ans.

- (2.) $5 \times 5 \times 5 = 125$;
 $125 \times 125 = 15625$, Ans.

- (3.) $\sqrt{484} = 22$ = the number of dollars per acre, also
the number of acres.

- (4.) $\sqrt[3]{1953.125} = 12.5$ ft., Ans.

(5.) $\sqrt{841} = 29$, Ans.

(6.) 1 solid ft. = 1728 solid in., and $\frac{1}{2}$ solid ft. = $\frac{1}{2}$ of 1728 solid in. = 864 solid in;
 $\frac{1}{2}$ ft. = 6 in; $6^3 = 6 \times 6 \times 6 = 216$ solid in. = a solid $\frac{1}{2}$ ft.;
 $864 - 216 = 648$ solid in. = 3 times 216 solid in. = 3 solid $\frac{1}{2}$ ft., Ans.

(7.) $(\frac{1}{2})^2 : 1^2 :: 4 \text{ hours} : 16 \text{ hours}$, the time 1 pipe $\frac{1}{2}$ in. in diameter will fill the cistern, and 2 pipes will fill it in $\frac{1}{2}$ of 16 hours, or 8 hours, Ans.

(8.) To make the gain and loss equal for every 2 lb. he takes of the first kind, he must take 5 lb. of the second.

(9.) $51 - 6 = 45$; $10 - 1 = 9$;
 $45 \div 9 = 5$, common difference, and, therefore, the difference between the 9th and 10th.

(10.) $50 \div 2 = 25$;
 $26.7 \times 25 = 667.5$ sq. ft. = $74.1\frac{2}{3}$ yd.;
 $\frac{1}{5}$ of a dollar = .20;
 $74.1\frac{2}{3} \times .20 = \$14.83+$, Ans.

(11.) 10 A. = 1600 sq. rd.;
 $\sqrt{1600} = 40$ rd., depth of side;
 $40^2 \times 2 = 3200$;
 $\sqrt{3200} = 56.55+$ rd., length of diagonal line;
 $56.55 \div 2 = 28.27+$ rd., length of rope, Ans.

(12.) $3072 \div 12 = 256$;
 $\sqrt{256} = 16 =$ the rate;
12 = first term;
 $12 \times 4 = 48 =$ second term,
 $48 \times 4 = 192 =$ third term;
 $192 \times 4 = 768 =$ fourth term;
 $768 \times 4 = 3072 =$ fifth term.

- (13.) $\$924 \div 7 = \132 , part of the price at the end of each year.

An annuity of \$132 at compound interest for seven years at 6 % = \$1107.98 +.

Present worth of the annuity = $\$1107.98 \div \1.50363
 = \$736.86 +. $\$736.86 - \$700 = \$36.86$, most advantageous of cash down.

EXERCISES IN ANALYSIS.

(PAGES 312-316.)

- (2.) $\frac{8}{3}, 3\frac{2}{7}, 6\frac{2}{5} = \frac{8}{3}, \frac{24}{7}, \frac{32}{5} = \frac{288}{315}, \frac{1080}{315}, \frac{2016}{315}$;
 Greatest common divisor of 280, 1080, and 2016
 three hundred fiftieths is $\frac{8}{315}$, Ans.
- (3.) $\frac{2}{3}, \frac{3}{8}, \frac{6}{7}, \frac{11}{5} = \frac{560}{840}, \frac{315}{840}, \frac{720}{840}, \frac{1848}{840}$.
 Greatest common divisor of 560, 315, 720, and 1848
 eight hundred fortieths is $\frac{1}{840}$, Ans.
- (5.) $\frac{3}{2}, \frac{9}{7}, \frac{5}{8} = \frac{42}{56}, \frac{48}{56}, \frac{35}{56}$.
 Least common multiple of 42, 48, and 35 fifty-sixths
 is $\frac{1680}{56} = 30$, Ans.
- (6.) Least common multiple of \$.75, \$.37 $\frac{1}{2}$, and \$2.06 $\frac{1}{4}$ =
 \$8.25, Ans.
- (8.) $46656 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$
 $\times 3 \times 3 \times 3$;
 $2 \times 3 = 6 =$ sixth root, Ans.

$$(9.) \quad 252 = 12\frac{5}{7} = \frac{5 \times 5 \times 5}{7 \times 7 \times 7};$$

$\sqrt[7]{}$ cube root, Ans.

- (11.) If $\frac{1}{6}$ of the time past midnight = $\frac{2}{3}$ = $\frac{4}{6}$ of the time past noon, $\frac{2}{3}$, or the time past midnight = $\frac{2}{6}$ of the time past noon; hence, the time from midnight to noon, or 12 hours, is $\frac{2}{6} - \frac{4}{6} = \frac{1}{3}$ of the time past noon, and the time past noon must be $\frac{6}{1}$ of 12 hours, or 4 hours;

Therefore, the hour must be 4 o'clock, P. M., Ans.

- (12.) If $\frac{1}{2}$ of the time past 10 o'clock A. M. is the time till 10 o'clock P. M., $\frac{1}{2}$ of the time past 10 o'clock A. M. plus $\frac{2}{3}$ of the time past 10 o'clock A. M. is $\frac{3}{2}$, or the time from 10 o'clock A. M. to 10 o'clock P. M., which is 12 hours; then, $\frac{1}{2}$ of the time past 10 o'clock A. M. must be $\frac{1}{3}$ of 12 hours, or 4 hours, and $\frac{2}{3}$ of the time past must equal 8 hours.

Hence, the time must be 6 o'clock P. M., Ans.

$$(14.) \quad \begin{aligned} 73 \div 5 &= 14\frac{3}{5}; \\ 73 \div 8 &= 9\frac{1}{8}; \\ 73 \div 10 &= 7\frac{3}{10}. \end{aligned}$$

The least common multiple of $14\frac{3}{5}$, $9\frac{1}{8}$, $7\frac{3}{10}$ = $222\frac{3}{2}$ = 73 days, Ans.

- (15.) $11 \div 2 = 5\frac{1}{2}$, distance A travels in 1 min.;
 $17 \div 3 = 5\frac{2}{3}$, " B " " " "
 $5\frac{2}{3} - 5\frac{1}{2} = \frac{1}{6}$ rd. B gains in 1 min.;
 $135 \div 2 = 67\frac{1}{2}$ rd., distance to gain;
 $67\frac{1}{2} \div \frac{1}{6} = 405$ min. = the time they are traveling;
 $5\frac{1}{2} \times 405 = 2227\frac{1}{2}$; $2227\frac{1}{2} \div 135 = 16\frac{1}{2}$, the number of times A travels round;
 $5\frac{2}{3} \times 405 = 2295$; $2295 \div 135 = 17$, the number of times B travels round.

- (17.) At 4 o'clock the hands were 20 spaces apart; therefore, the minute hand must gain 20 spaces. If it gain 55 spaces every time it passes over 60, it will gain 1 minute space in $\frac{1}{55}$ of 60, and 20 spaces in $\frac{20}{55}$ of 60 =
21 min. $49\frac{1}{11}$ sec. past 4 o'clock, Ans.
- (18.) The time from Tuesday noon to Sunday at $10\frac{1}{4}$ o'clock
A. M. = 4 d. $22\frac{1}{4}$ h. = $4\frac{9}{8}$ d.
3 min. 10 sec. = 190 sec.;
 $190 \times 4\frac{9}{8} = 936\frac{7}{8}$ sec. = 15 min. $36\frac{7}{8}$ sec.;
10 min. + 15 min. + $36\frac{7}{8}$ sec. = 25 min. $36\frac{7}{8}$ sec.;
10 o'clock 15 min. + 25 min. $36\frac{7}{8}$ sec. =
10 o'clock 40 min. $36\frac{7}{8}$ sec., Ans.
- (20.) Had he worked every day, he would have received 80 times \$.72 = \$57.60. He lost, therefore, \$57.60 + \$12 = \$69.60. Every day he was idle he lost \$.72 + \$.48 = \$1.20.
\$69.60 \div \$1.20 = 58 days idle, Ans.
- (21) If he had worked every day, he would have received 25 times \$1.25 = \$31.25;
\$31.25 - \$23.75 = \$7.50.
Every day he was idle he lost \$1.25 + .25 = \$1.50;
\$7.50 \div \$1.50 = 5 days idle;
25 - 5 = 20, number of days he worked, Ans.
- (23) \$40 \div 8 = \$5. Therefore, B spends \$5 per year more than his income, and \$30 - \$5 = \$25, which is $\frac{1}{3}$ of each one's income.
 $\frac{3}{8}$, or the whole income = \$200.
A spends $\frac{7}{8}$ of \$200 = \$175;
B " \$200 + 5 = \$205.

- (24.) If they save \$400 in 4 years, in one year they will save \$100. Both incomes = \$800, and if they save \$100, they will both spend \$800 — \$100 = \$700; \$700 — \$40 = \$660.
 $\$660 \div 2 = \330 , B spends.
 $\$330 + \$40 = \$370$ A spends.
- (26.) A is entitled to $\frac{1}{2}$, and $\frac{1}{2}$ will remain for B and C.
 Therefore, as $1 : \frac{1}{2} :: 60^2 : 1800$;
 $\sqrt{1800} = 42.426+$ in., the part remaining after A has ground his share.
 $60 - 42.426+ = 17.573+$ in., A's share.
 B is entitled to $\frac{1}{4}$, and $\frac{1}{4}$ will remain;
 Therefore, as $1 : \frac{1}{4} :: 60^2 : 900$;
 $\sqrt{900} = 30$ in.;
 $42.426+ - 30 = 12.426+$ in., B's share; and there remains, as C's share, a part 30 in. in diameter.
- (27.) Each lady is entitled to $\frac{1}{4}$. After the first has taken her share, $\frac{3}{4}$ will remain;
 Hence, as $1 : \frac{3}{4} :: 5^3 : 93.75$;
 $\sqrt[3]{93.75} = 4.542+$ in.;
 $5 - 4.542 = .45+$ in.;
 Therefore, the first lady winds off .45 in.
 After the second has taken her share, $\frac{1}{2}$ will remain;
 Hence, as $1 : \frac{1}{2} :: 5^3 : 62.5$;
 $\sqrt[3]{62.5} = 3.968+$ in.;
 $4.542 - 3.968 = .57+$ in.;
 Therefore, the second winds off .57 in.
 After the third lady has taken her share, $\frac{1}{4}$ will remain;
 Hence, as $1 : \frac{1}{4} :: 5^3 : 31.25$,
 $\sqrt[3]{31.25} = 3.149+$ in.;
 $3.968 - 3.149 = .82$ in. nearly;
 Therefore, the third lady winds off .82 in., and there remains, as the fourth lady's share, a part 3.14+ in. in diameter.

MISCELLANEOUS EXERCISES.

(PAGES 317-320.)

(1.) $22515 \div 95 = 237$, Ans.

(2.) $\frac{1}{3}$ of 2 = $\frac{2}{3}$;
 $\frac{\frac{2}{3}}{\frac{2}{3}} = \frac{2}{2} = 1$, Ans.

(3.) $\frac{1}{2} + \frac{2}{4} + \frac{1}{6} = \frac{20}{12}$;
 $80 \div \frac{20}{12} = 84$, Ans.

(4.) $\frac{2}{3}$ of $\frac{4}{5}$ of $1\frac{1}{2} = \frac{4}{5}$;
And $\frac{4}{5}$ divided by itself will produce 1;
Or, $\frac{4}{5} \times 1 = \frac{4}{5}$, Ans.

(5.) $.1 \times .1 = .01$, Ans.

(6.) 113 A. 145 P. = 18225 P.;
12 A. 10 P. = 1930 P.;
 $18225 \div 1930 = 9\frac{171}{386}$, Ans.

(7.) $7^1 \div 15 = \frac{7}{15}$ min. = 28 sec., Ans.

(8.) 5 m. = 1600 rd.;
3 m. 5 fur. $18\frac{1}{2}$ rd. = $1178\frac{1}{2}$ rd.;
 $\frac{1178\frac{1}{2}}{1600} = \frac{2357}{3200}$, Ans.

(9.) 43560 = number of sq. ft. in 1 acre.
 $\sqrt{43560} = 208\frac{1}{2}$ ft., length of one side of an acre;
 $208 \div 4 = 52$ spaces.
If the hills occupy simply a mathematical point, and
be planted to the edge of the land, there may be
53 rows with 53 hills in a row, or $53 \times 53 =$

2809 hills. But the points are supposed to be 2 ft. from the margin, leaving between the outside hills 204 ft. each way. This gives 51 spaces of 4 ft. each, and there will be 1 more hill than spaces, or $51 + 1 = 52$ hills; $52 \times 52 = 2704$, the number of hills, Ans.

- (10.) 8 miles — 6 miles = 2 miles;
 20 hours $\div 2 = 10$ hours, Ans.
- (11.) $3\frac{1}{2} \times 6\frac{1}{4} = \frac{175}{8}$; $6\frac{1}{4}$ cu. ft. = 10800 cu. in.;
 $10800 \div \frac{175}{8} = 493\frac{5}{7}$ in. in length = $41\frac{1}{4}$ ft., Ans.
- (12.) $\frac{1}{2}$ of $\frac{1}{2}$ of $\frac{1}{2}$ of $\frac{1}{2} = \frac{1}{16}$;
 $\frac{1}{16}$ of 1 gal., or 32 gills = 2 gills, Ans.
- (13.) As 1.45 : 1.00 :: 1.00 : .682 $\frac{2}{3}$, Ans.
- (14.) 100 % — 30 % = 70 %. If 70 % = \$.84, 1 % = \$.012, and 120 % = \$.012 \times 120 = \$1.44, Ans.
- (15.) .9325 + .00125 = .93375;
 $\$540 \div .93375 = \$578\frac{2}{3}$, Ans.
- (16.) If he gave away $\frac{1}{2}$ of an apple more than $\frac{1}{2}$ of the number at the last gate, and had 1 left, he must have had 1 more than twice 1, or 3 at the last gate; and, for like reason, 7 at the second gate; and 15 at the first gate.
- (17.) A can do $\frac{1}{3}$ of the work in a day; B can do the work in $\frac{1}{3}$ of 8 days, or $\frac{8}{3}$ of it in one day; C can do the work in $\frac{1}{3}$ of 12 days, or $\frac{5}{12}$ of it in one day; Hence, they can all do in one day $\frac{1}{3} + \frac{3}{8} + \frac{5}{12} = \frac{27}{24}$; Then, as $\frac{27}{24} : \frac{24}{24} :: 1 \text{ day} : \frac{8}{9} \text{ of a day} = 21\frac{1}{3}$ hours, Ans.

- (18.) $\$.15 \div .90 = \$.16\frac{2}{3}$;
 $40\% \text{ of } \$.16\frac{2}{3} = \$.06\frac{2}{3}$;
 $\$.16\frac{2}{3} + \$.06\frac{2}{3} = \$.23\frac{1}{3}$, the selling price per pound;
 $525 \div .23\frac{1}{3} = 2250 \text{ lb., Ans.}$
- (19.) $\$220 \div .12 = \$1833.33\frac{1}{3}$;
 $\$1833.33\frac{1}{3} - \$1575 = \$258.33\frac{1}{3}$, Ans.
- (20.) Compound interest of \$300 for 4 years at 6 % =
 $\$78.74+$;
 Annual interest = \$78.48;
 $\$78.74+ - \$78.48 = \$.26+$, Ans.
- (21.) Three months after Jan. 6 = April 6;
 The time from March 4 to April 6 = 33 days; and
 $33 \text{ days} + 3 \text{ days of grace} = 36 \text{ days, Ans.}$
- (22.) 8 mo. after Jan. 20 = Sept. 20;
 Time from June 20 to Sept. 20 = 3 mo.;
 Interest of \$40 for 3 mo. and 3 d. at 2 % a mo. =
 $\$2.48$;
 $\$40 - \$2.48 = \$37.52$, Ans.
- 23.) $\frac{1}{2}, \frac{1}{3}, \frac{1}{4} = \frac{6}{12}, \frac{4}{12}, \frac{3}{12}$;
 $\frac{1}{2} \text{ of } \frac{6}{12} = \frac{3}{12}$;
 $\frac{3}{12} \text{ for 4 mo.} = \frac{12}{12} \text{ for 1 mo.};$
 $\frac{3}{12} \text{ for 13 mo.} = \frac{39}{12} \text{ for 1 mo.};$
 $\frac{12}{12} + \frac{39}{12} = \frac{51}{12}$, A's capital for 1 mo.
 $\frac{4}{12} \text{ for 13 mo.} = \frac{52}{12}$, B's capital for 1 mo.
 $\frac{3}{12} \text{ for 13 mo.} = \frac{39}{12}$, C's capital for 1 mo.
 $\frac{51}{12} + \frac{52}{12} + \frac{39}{12} = \frac{142}{12}$;
 A should receive $\frac{51}{142}$ of \$2840 = \$1020.
 B should receive $\frac{52}{142}$ of \$2840 = \$1040.
 C should receive $\frac{39}{142}$ of \$2840 = \$780.

- (24.) 1 franc = \$.186; $$.186 \times 250 = \46.50 ;
 $.20$ of $\$46.50 = \9.30 ;
 $\$46.50 + \$9.30 = \$55.80$, the price in United States
 money for which it must be sold to gain 20% .
 1 liter = $.26417$ gal.;
 $.26417 \times 100 = 26.417$ gal.;
 $\$55.80 \div 26.417 = \$2.11+$, Ans.
- (25.) If 6 lb. of coffee = 20 lb. of sugar, 4 lb. of coffee, or
 3 lb. of tea = $\frac{2}{3}$ of 20 = $13\frac{1}{3}$ lb. of sugar; and
 if 3 lb. of tea = $13\frac{1}{3}$ lb. of sugar, 3 times 3 lb., or
 9 lb. of tea = 3 times $13\frac{1}{3}$ = 40 lb. of sugar, Ans.
- (26.) The express reaches the point in as many hours as 25
 is found times in $120 = 4\frac{4}{5}$ hours, or 4 h. 48 min.
 It will take the slow train as many times 50 min. as
 15 is found times in $120 = 8$ times; and 8 times
 50 min. = 400 min. = 6 h. 40 min.
 The slow train must start as much before 2 as the
 difference.
 6 h. 40 min. — 4 h. 48 min. = 1 h. 52 min.; and 1 h.
 52 min. before 2, is 12 o'clock, 8 min., Ans.
- (27.) The amount of \$200 for 3 mo. at 6% = \$203, Ans.
- (28.) $\$6460 - \$5000 = \$1460$.
 The interest of \$5000 at 1% for 4 years = \$200;
 $\$1460 \div \$200 = .07\frac{3}{5} = 7\frac{3}{5}\%$, Ans.
- (29.) There will be 16 boards 24 ft. long and 1 ft. wide;
 and 16 times 24 ft. = 384 ft., Ans.
- (30.) $2 \times 1.4 \times 1 = 2.8$ cu. meters;
 1 cu. meter = 10 hectoliters;
 $2.8 \times 10 = 28$ hectoliters;
 $28 \times 75 = 2100$ kilos., Ans.

- (31.) $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$;
 Therefore, $\frac{1}{6}$ must remain.
 $25 - 5 = 20 = \frac{1}{6}$ of the whole;
 $\frac{6}{6} = 120$;
 $\frac{1}{2}$ of 120 lb. + 25 lb. = 85 lb. of coffee;
 $\frac{1}{3}$ of 120 lb. - 5 lb. = 35 lb. of chicory;
 $1\frac{35}{120}$, or $29\frac{1}{8}\%$ of the whole = chicory, Ans.
- (32.) \$144 for 7 mo. = \$1008 for 1 mo. ;
 $\frac{1}{2}$ of \$144 = \$72 ;
 $\frac{1}{4}$ of \$144 = \$48 for 4 mo. = \$192 for 1 mo. ;
 $\$1008 - \$192 = \$816$;
 $\$72 + \$48 = 120$;
 $\$144 - \$120 = \$24$;
 $816 \div 24 = 34$ mo. =
 2 years, 10 mo., Ans.
- (33.) Interest of \$1 for 63 days = \$.0105 ;
 $\$1 - \$.0105 = \$.9895$;
 $\$3958 \div .9895 = \4000 , Ans.
- (34.) 4 meters = 40 decimeters ;
 3 centimeters = .3 decimeters ;
 $40 \times 1 \times .3 = 12$ cu. decimeters ;
 1 liter = 1 cu. decimeter ;
 12 liters = 12 cu. decimeters ;
 12 liters will weigh 12 kilos. ;
 $12 \times 7.8 = 93.6$ kilos., Ans.
- (35.) $3^2 \times 3 : 6^2 :: 3 \text{ h.} : 4 \text{ h.}$, the time 3 pipes 3 in. in diameter will discharge the same amount of water as 1 pipe 6 in. in diameter ; and the three pipes will discharge 3 times the quantity in 3 times 4 h., or in 12 h., Ans.

- (36.) The interest of \$600 for 3 mo. and 20 d. at $\frac{1}{2}\%$ =
\$12.83 ;

$$\$600 - \$12.83 = \$587.17, \text{ Ans.}$$

- (37.) The cat gains 2 ft. every quarter of an hour, except the last, when she gains an additional 2 ft. This deducted from 24 ft. = 22 ft. The cat will be as many quarters of an hour catching the mouse as 2 is found times in 22, or 11 qr. = $2\frac{1}{4}$ h., Ans.

- (38.) $40^2 = 1600$;
 $36^2 = 1296$;
 $1600 + 1296 = 2896$;
 $\sqrt{2896} = 53.81 + \text{rd.}, \text{ Ans.}$

- (39.) 1 A. 41 rd. = 201 rd. ;
 $201 \div .7854 = 255.92 + \text{sq. rd.}$;
 $\sqrt{255.92} + = 16 \text{ rd. nearly} = \text{the diameter of the garden.}$
 $201 - 12 = 189 \text{ rd.}$;
 $189 \div .7854 = 240.64 \text{ sq. rd.}$;
 $\sqrt{240.64} = 15.5 + \text{rd.} = \text{the diameter}$;
 $16 - 15.5 = .5 + \text{rd.} = 8 \text{ ft.} +$;
 $8 \text{ ft.} \div 2 = 4 \text{ ft., width of the walk, Ans.}$

APPENDIX.

(ART. 461, p. 323.)

(1.)

| | | |
|---|--------------|---------------|
| Principal, | | \$1000.00 |
| 1st payment, | \$100.00 | |
| Interest of \$1000 from July 1, 1864, to June 1, 1865, | <u>30.00</u> | |
| Balance to liquidate the principal, | | <u>70.00</u> |
| New principal, | | \$930.00 |
| 2d payment, | \$223.99 | |
| Interest of \$930 from Jan. 1, 1865, to Sept. 1, 1866, | <u>93.00</u> | |
| Balance to liquidate the principal, | | <u>130.99</u> |
| New principal, | | \$799.01 |
| Interest of \$799.01 from Sept. 1, 1866, to Dec. 25, 1866, | \$15.18 | |
| 3d payment, | <u>12.00</u> | |
| Balance of interest, | \$3.18 | |
| Interest of \$799.01 from Dec. 25, 1866, to Jan. 1, 1867, | <u>.93</u> | |
| Sum of interest due, | | <u>4.11</u> |
| Balance of note due Jan. 1, 1867, | | \$803.12 |

If the interest of \$799.01 be taken from Sept. 1, 1866, to Jan. 1, 1867, instead of from Sept. 1, 1866, to Dec. 25, 1866, and from Dec. 25, 1866, to Jan. 1, 1867, it will be \$15.98, and the answer \$802.99.

(2.)

| | | |
|--|--------------|-----------------|
| Principal, | | \$700.00 |
| 1st payment, | \$164.00 | |
| Interest of \$164 from Dec. 18, 1864, to Feb. 4, 1865, | <u>1.26</u> | |
| Amount of payment, | \$165.26 | |
| Interest of \$700 from Feb. 4, 1864, to Feb. 4, 1865, | <u>42.00</u> | |
| Balance to liquidate the principal, | | <u>123.26</u> |
| New principal, | | \$576.74 |
| 2d payment, | \$200.00 | |
| Interest of \$200 from June 24, 1865, to Feb. 4, 1866, | <u>7.33</u> | |
| 3d payment, | 120.00 | |
| Interest of \$120 from Sept. 11, 1865, to Feb. 4, 1866, | <u>2.86</u> | |
| Amount of payments, | \$330.19 | |
| Interest of \$576.74 from Feb. 4, 1865, to Feb. 4, 1866, | <u>34.60</u> | |
| Balance to liquidate the principal, | | <u>295.59</u> |
| New principal, | | \$281.15 |
| 4th payment, | \$60.00 | |
| Interest of \$60 from July 5, 1866, to Nov. 28, 1866, | <u>1.43</u> | |
| Amount of payment, | \$61.43 | |
| Interest of \$281.15 from Feb. 4, 1866, to Nov. 28, 1866, | <u>13.78</u> | |
| Balance to liquidate the principal, | | <u>47.65</u> |
| Balance of note, Nov. 28, 1866, | | \$233.50 |

(3.)

| | | |
|---|----------|-----------------|
| Principal, | | \$625.50 |
| 1st payment, | \$200.00 | |
| Interest of \$625.50 from Oct. 1, 1864, | | |
| to Jan. 1, 1865, | 9.38 | |
| Balance to liquidate the principal, | | <u>190.62</u> |
| New principal, | | \$434.88 |
| Interest of \$434.88 from Jan. 1, 1865, | | |
| to Nov. 1, 1865, | \$21.74 | |
| 2d payment, | 20.00 | |
| Balance of interest, | \$1.74 | |
| Interest of 434.88 from Nov. 1, 1865, to | | |
| Jan. 1, 1866, | 4.35 | |
| Sum of interest, | \$6.09 | |
| 3d payment, | \$300.00 | |
| Interest, | 6.09 | |
| Balance to liquidate the principal, | | <u>293.91</u> |
| New principal, | | \$140.97 |
| Interest of \$140.97 from Jan. 1, 1866, to May 1, | | |
| 1866, | | 2.82 |
| Balance of note due May 1, 1866, | | <u>\$143.79</u> |

(4.)

| | | |
|--------------------------------|---------|-------------------|
| Principal, | | \$1000.00 |
| Interest of \$1000 for 1 year, | \$60.00 | |
| 1st payment, | \$24.00 | |
| Interest of \$24 from April 1, | | |
| 1866, to Jan. 1, 1867, | 1.08 | |
| 2d payment, | 4.00 | |
| Interest of \$4 from Aug. 1, | | |
| 1866, to Jan. 1, 1867, | .10 | |
| Carried forward, | \$29.18 | \$60.00 \$1000.00 |

| | | | |
|---|--------------|--------------|---------------|
| Brought forward, | \$29.18 | \$60.00 | \$1000.00 |
| 3d payment, | 6.00 | | |
| Interest of \$6 from Dec. 1, | | | |
| 1866, to Jan. 1, 1867, | <u>.03</u> | | |
| Amount of payments, | | <u>35.21</u> | |
| Balance of interest, | | \$24.79 | |
| 4th payment, | \$60.00 | | |
| Interest of \$60 from Feb. 1, | | | |
| 1867, to Jan. 1, 1868, | 3.30 | | |
| 5th payment, | 40.00 | | |
| Interest of \$40 from July 1, | | | |
| 1867, to Jan. 1, 1868, | <u>1.20</u> | | |
| Amount of payments, | | \$104.50 | |
| Interest of \$1000 from Jan. 1, | | | |
| 1867, to Jan. 1, 1868, | \$60.00 | | |
| Balance of interest unpaid Jan, | | | |
| 1, 1867, | 24.79 | | |
| Interest of \$24.79 from Jan. 1, | | | |
| 1867, to Jan. 1, 1868, | <u>1.49</u> | | |
| Sum of interests, | | \$86.28 | |
| Balance to liquidate the principal, | | | <u>18.22</u> |
| New principal, | | | \$981.78 |
| Interest of \$981.78 from Jan. 1, 1868, | | | |
| to Jan. 1, 1869, | \$58.91 | | |
| Interest of \$58.91 from Jan. 1, 1869, to | | | |
| June 1, 1870, | 5.01 | | |
| Interest of \$981.78 from Jan. 1, 1869, | | | |
| to Jan. 1, 1870, | 58.91 | | |
| Interest of \$58.91 from Jan. 1, 1870, to | | | |
| June 1, 1870, | 1.47 | | |
| Interest of \$981.78 from Jan. 1, 1870, | | | |
| to June 1, 1870, | <u>24.54</u> | | |
| Sum of interests, | | | <u>148.34</u> |
| Balance of note June 1, 1870, | | | \$1130.62 |

(ART. 462, p. 324.)

(1.)

| | | |
|---|---------------|-------------------|
| Principal, | | \$2000.00. |
| Interest from Jan. 1, 1870, to Jan. 1, 1871, | \$120. | |
| Interest on \$120 to Jan. 1, 1873, | 14.40 | |
| Interest from Jan. 1, 1871, to Jan. 1, 1872, | 120. | |
| Interest on \$120 to Jan. 1, 1873, | 7.20 | |
| Interest from Jan. 1, 1872, to Jan. 1, 1873, | <u>120.00</u> | 381.60. |
| | | \$2381.60. |
| First payment, July 1, 1872, | \$500. | |
| Interest to Jan. 1, 1873, | <u>15.</u> | 515.00. |
| | | \$1866.60. |
| Interest from Jan. 1, 1873, to Jan. 1, 1874, | \$111.99 + | |
| Second payment, Oct. 1, 1873, being less than accruing interest, | 50.00 | |
| | \$61.99 + | |
| Interest to Jan. 1, 1875, | 7.43 + | |
| Interest from Jan. 1, 1874, to Jan. 1, 1875, | 111.99 + | |
| Interest to Jan. 1, 1876, | 6.71 + | |
| Interest from Jan. 1, 1875, to Jan. 1, 1876, | 111.99 + | 300.11. |
| Amount due Jan. 1, 1876, | | <u>\$2166.71.</u> |

(2.)

| | | |
|---|--------------|------------------|
| Principal, | | \$1000.00. |
| Interest from Jan. 1, 1876, to Jan. 1, 1877, | \$60.00 | |
| 1st payment, April 1, 1876, | \$24. | |
| 2d payment, Aug. 1, 1876, | 4. | |
| 3d payment, Dec. 1, 1876, | <u>6.</u> | 34.00 |
| | | \$26.00 |
| Interest to Jan. 1, 1878, | 1.56 | |
| Interest from Jan. 1, 1877, to Jan. 1, 1878, | <u>60.00</u> | 87.56 |
| | | <u>\$1087.56</u> |

| | | |
|----------------------------|-------------|-----------------|
| 4th payment, Feb. 1, 1877, | \$60.00 | |
| Interest to Jan. 1, 1878, | 3.30 | |
| 5th payment, July 1, 1877, | 40.00 | |
| Interest to Jan. 1, 1878, | <u>1.20</u> | 104.50 |
| | | <u>\$983.06</u> |

| | | |
|--|-------------|------------------|
| Interest from Jan. 1, 1878, to Jan. 1, 1879, | \$58.98 | |
| Interest to June 1, 1880, | 5.01 | |
| Interest from Jan. 1, 1879, to Jan. 1, 1880, | 58.98 | |
| Interest to June 1, 1880, | <u>1.47</u> | 124.44 |
| | | <u>\$1207.50</u> |

(3.)

| | | |
|--|--|------------------|
| Principal, | | \$1200.00 |
| Interest from May 1, 1878, to May 1, 1879, | | <u>72.00</u> |
| | | <u>\$1272.00</u> |

| | | |
|----------------------------|------------|------------------|
| 1st payment, July 1, 1878, | \$200. | |
| Interest to May 1, 1879, | <u>10.</u> | 210.00 |
| | | <u>\$1062.00</u> |

| | | |
|--|----------------|--|
| Interest from May 1, 1879, to May 1, 1880, | \$63.72 | |
| 2d payment, | <u>50.00</u> | |
| | <u>\$13.72</u> | |

| | | |
|--|--------------|------------------|
| Interest to May 1, 1881, | .82 | |
| Interest from May 1, 1880, to May 1, 1881, | <u>63.72</u> | 78.36. |
| | | <u>\$1140.36</u> |

| | | |
|----------------------------|-------------|-----------------|
| 3d payment, Sept. 1, 1880, | \$600.00 | |
| Interest to May 1, 1881, | 24.00 | |
| 4th payment, Jan. 1, 1881, | 220.00 | |
| Interest to May 1, 1881, | <u>4.40</u> | 848.40 |
| | | <u>\$291.86</u> |

(ART. 463, p. 324.)

| | | |
|-------------------------|-------------------|-----------------|
| (1.) \$17,000 pays \$16 | $\times 17 =$ | \$272.00 |
| 500 pays | $1.60 \times 5 =$ | 8.00 |
| 65 pays | | 1.04 |
| <u>\$17,565 pays</u> | | <u>\$281.04</u> |
| 1 poll tax, | | 2.00 |
| B's tax, | | <u>\$283.04</u> |

- (2.) $\$2565 \times .012 = \30.78
 1 poll tax, 2.00
 Sawyer's tax, $\overline{\$32.78}$
 $\$32.78 \times .03 = \98 , discount.
- (3.) $\$1.50 \times 650 = \975 , amount of poll tax.
 $\$7993.80 - \$975 = \$7018.80$, property tax.
 $\$865,500 + \$255,600 = \$1,121,100$, total taxed.
 $\$7,018.80 \div \$1,121,100 = .006$ + rate on a dollar.
- (4.) $\$2 \times 8600 = \$17,200$, amount of poll tax.
 $\$264,700 - \$17,200 = \$247,500$, property tax.
 $\$247,500 \div \$16,500,000 = .015$, rate on a dollar.
 $\$13,150 \times .015 = \197.25 , property tax.
 $\$197.25 + \$2 = \$199.25$, Smith's tax,

(ART. 466, p. 326.)

- (1.) $109\frac{3}{4} + \frac{1}{4} = 110$; $\$110 \times 16 = \1760 .
- (2.) $\$1760 \div 16 = \110 ; $110 - \frac{1}{4} = 109\frac{3}{4}$; $109\frac{3}{4} - 100 = 9$
- (3.) $\$3120 \div \$104 = \$30$.
- (4.) $109\frac{3}{4} + \frac{1}{4} = 110$; $7 \div 110 = .06\frac{4}{11}$, or $6\frac{4}{11}\%$.
- (5.) $\$400 \div .08 = \5000 ; $\$5000 \times 1.12 = \5600 .
- (6.) $112 : 100 :: 5\% : 4\frac{1}{2}\%$.
 10-40's, the greater income by $4\frac{1}{2}\% - 4\% = \frac{1}{2}\%$.
- (7.) $100 - 5\frac{1}{2} = 94\frac{1}{2}$; $100 + 7\frac{1}{4} = 107\frac{1}{4}$.
 $107\frac{1}{4} - 94\frac{1}{2} = 12.75$.
 $\$12.75 \times 25 = \318.75 .
- (8.) $6\% : 5\% :: \$100 : \$83\frac{1}{3}$.
- (9.) $\$112 - \$95 = \$17$; $\$510 \div \$17 = 30$.
- (10.) $\$4000 \times 1.02 = \4080 ; $\$4000 \times .04 = \160 .
 $\$6000 \times 1.06 = \6360 ; $\$6000 \times .06 = \360 .
 $4080 : 4000 :: \$160 : \$156.86 +$
 $6360 : 6000 :: \$360 : \$339.62 +$
 $\$156.86 + \$339.62 = \$496.48 +$
- (11.) $93 + \frac{1}{8} = 93\frac{1}{8}$; $101\frac{3}{4} + \frac{1}{8} = 101\frac{7}{8}$.
 $\$101\frac{7}{8} - \$93\frac{1}{8} = \$7\frac{6}{8}$; $\$7.75 \times 50 = \387.50 .
- (12.) $121 - 110 = 11$; $11 \div 110 = .10$ or 10% .

(ART. 468, p. 328.)

- (1.) $\$31.89 \times 2 \times 4 \times 10 = \$2551.20.$
 (2.) $\$524 \times 10 \times 2 = \$1048; \$2000 - \$1048 = \$952.$

(ART. 472, p. 329.)

- (1.) $16 \times 12 \times 10 = 1920$ cu. ft.; $1920 \div 550 = 3\frac{2}{3}$ tons.
 (2.) $3 \times 12 \times 30 = 1080$; $\frac{3}{4}$ of 1080 = 810 lb.; $1080 - 810 = 270$; $2.70 \times 60 = 162$ lb. Ans. 810 lb. of hay; 162 lb. of oats.
 (3.) $6 \times 5 \times 4 \times \frac{1}{10} = 96$ bu.
 (4.) $35 \times 6 \times 8 \times \frac{1}{10} = 672$ bu.; $672 \times .50 = \$336.$
 (5.) $30 \times 12 \times 15 = 5400$; $5400 \div 500 = 10.8$; $10.8 \times 25 = \$270.$ $3 \times 11 \times 3 = 99$; $2\frac{1}{2} \times 10 \times 6 = 150$; $99 \times 150 = 249$ lb. $10.8 \times 2000 = 21600.0$ lb.; $21600 \div 249 = 86\frac{2}{3}$ days.

(ART. 474, p. 330.)

- (1.) $50 \times (11.8 \times 11.8) \div 144 = 48.347$ cu. ft.
 (2.) 5 ft. 10 in. = 70 in.; $\frac{1}{4} \times \frac{1}{4} = 306.25$; $(306.25 \times 32\frac{1}{2}) \div 144 = 69.119$; $69.119 \times .40 = \$27.647 + = \$27.65.$
 (3.) $\frac{\$16 \times 24 \times 20 \times 20}{144 \times 40} = \$26.66\frac{2}{3}, \text{ or } \$26.67.$

(ART. 475, p. 330.)

- (1.) $\frac{24 \times 20 \times 10}{12} = 400$ bd. ft.
 (2.) $30 \times .7041 = 21.21 +$ inches.
 (3.) $\frac{25 \times 32 \times 30 \times 15}{12 \times 1000} = \$30.$

(ART. 478, p. 331.)

- (1.) $\frac{(66 \times 9) + (30 + 3) \times 9}{16\frac{1}{2}} = 54; 54 \times 2 = 108$ perch.

$$(2.) \quad \frac{40 \times 25 \times (20 \times 2)}{1000} = 40 \text{ thousands; } \$14 \times 40 = \$560.$$

$$\$1.80 \times 40 = \$72; \$.12 \times 10 \times 40 = \$48; \$560$$

$$+ \$72 + \$48 = \$680.$$

$$(3.) \quad \frac{45 \times 27}{9 \times 9} = 15 \text{ cask.}$$

$$(4.) \quad 105 \div 30 = 3\frac{1}{2}; \$2 \times 3\frac{1}{2} = \$7; \$.10 \times 10 \times 3\frac{1}{2} =$$

$$\$3.50; \$.50 \times 3 = \$1.50; \$4 \times 3\frac{1}{2} = \$14; \$2.25$$

$$\times 2 = \$4.50; \$7 + \$3.50 + \$1.50 + \$14 + \$4.50$$

$$+ \$3.50 = \$34.$$

(ART. 481, p. 332.)

$$(1.) \quad \frac{24 \times 15 \times 2}{120} = 6; \$6.50 \times 6 = \$39.00; \$.06 \times 6 \times$$

$$6 = \$2.16; \$3 \times 6 = \$18. \quad \$39 + \$2.16 + \$18$$

$$= \$59.16.$$

$$(2.) \quad \frac{40 \times 25}{150} = 6\frac{2}{3} \text{ thousands.}$$

$$(3.) \quad \frac{110 \times 63}{55 \times 9} = 14 \text{ thousands; } \$3.50 \times 14 = \$49; \$.07 \times$$

$$7 \times 14 = \$6.86; \$1.25 \times 14 = \$17.50; \$49 +$$

$$\$6.86 + 17.50 = \$73.36.$$

EXAMINATIONS IN ARITHMETIC.

(ART. 1-35, p. 333.)

| | | | |
|------|------------|------|--------------|
| (1.) | Ans. 25037 | (4.) | Ans. 231771 |
| | 404908 | | |
| | 56065605 | (5.) | 800000008808 |

(ART. 36-40, p. 333.)

| | | | |
|------|---------------------|-------|---------------------|
| (1.) | 13562 | (9.) | 991 |
| | 9045 | | 421 |
| | 22607 | | 191 |
| | <u>45214</u> Ans. | | <u>1603</u> Ans. |
| (2.) | 1004019 | | |
| | 701062 | (11.) | 13126 |
| | 12112 | | 550 |
| | 98 | | 15000 |
| | <u>1717291</u> Ans. | | <u>28676</u> Ans. |
| (4.) | 1441 Ans. | | |
| (5.) | 850 | (12.) | 1857610 |
| | 275 | | 1365976 |
| | 125 | | 847952 |
| | 93 | | 590631 |
| | <u>843</u> Ans. | | <u>4662169</u> Ans. |

(ART. 41-45, p. 335.)

| | | | | | |
|------|---------------|--------------|-------|---------------|------------|
| (1.) | 1000000 | | (10.) | 7362 | 1704 |
| | <u>675824</u> | | | <u>3876</u> | <u>305</u> |
| | 1675824 | Ans. | | 3486 | 1399 |
| | | | | <u>1399</u> | |
| (2.) | 4469 | | | 2087 | Ans. |
| | <u>1868</u> | | | | |
| | 2601 | Ans. | (11.) | 39672 | |
| | | | | <u>11399</u> | |
| (4) | 16525 | 20000 | | 28273 | Ans. |
| | <u>736</u> | <u>17261</u> | | | |
| | 17261 | 2739 | (12.) | 576 | 403 |
| | | Ans. | | <u>208</u> | <u>256</u> |
| (5.) | 1005080 | | | 368 | 147 |
| | 409790 | | | <u>1645</u> | <u>814</u> |
| | <u>242699</u> | | | 2013 | 961 |
| | 1657569 | | | <u>321</u> | <u>195</u> |
| | <u>958791</u> | | | 1692 | 766 |
| | 698778 | Ans. | | <u>766</u> | |
| | | | | 926 | Ans. |
| (7.) | 10000 | | (13.) | 43005 | |
| | <u>19</u> | | | <u>31967</u> | |
| | 9981 | Ans. | | 11038 | Ans. |
| (8.) | 1199913 | | (14.) | 1834337 | |
| | <u>315594</u> | | | <u>873055</u> | |
| | 884319 | Ans. | | 961282 | Ans. |
| (9.) | 376 | | (15.) | 1000 | |
| | 911 | | | <u>500</u> | |
| | <u>17938</u> | | | 1500 | |
| | 19225 | | | <u>1363</u> | |
| | <u>13654</u> | | | 137 | Ans. |
| | 5571 | Ans. | | | |

$$\begin{array}{r}
 (16.) \quad 766 \quad 695 \\
 \quad 523 \quad 419 \\
 \quad \underline{812} \quad \underline{811} \\
 \quad 2101 \quad 1925 \\
 \quad \underline{1925} \\
 \quad 176 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (18.) \quad 5260 \\
 \quad 3580 \\
 \quad \underline{8840} \\
 \quad 17680 \\
 \quad \underline{15300} \\
 \quad 2380 \text{ Ans.}
 \end{array}$$

(ART. 46-55, p. 336.)

$$(1.) \quad 2878 \times 15 = 43170 \text{ Ans.}$$

$$(2.) \quad 761 \times 55 = 41855 \text{ Ans.}$$

$$(3.) \quad 8800 \times 6 = 52800 \text{ Ans.}$$

$$(4.) \quad 74000 \times 16 = 1184000 \text{ Ans.}$$

$$\begin{array}{r}
 (5.) \quad 58325 \\
 \quad 317 \\
 \quad \underline{408275} \\
 \quad 58325 \\
 \quad \underline{174975} \\
 \quad 18489025 \text{ Ans.}
 \end{array}$$

$$(6.) \quad 2750 \times 18 = 49500 \text{ Ans.}$$

$$\begin{array}{r}
 (7.) \quad 365 \\
 \quad 156 \\
 \quad \underline{2190} \\
 \quad 1825 \\
 \quad \underline{365} \\
 \quad 56940 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (8.) \quad 24 \\
 \quad 42 \\
 \quad \underline{48} \\
 \quad 96 \\
 \quad \underline{1008} \\
 \quad 30 \\
 \quad \underline{30240 \text{ Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (10.) \quad 1231413 \\
 \quad 1008 \\
 \quad \underline{9851304} \\
 \quad 1231413 \\
 \quad \underline{1241264304 \text{ Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (11.) \quad 116 \times 9 = 1044 \\
 \quad 350 \times 30 = 10500 \\
 \quad 220 \times 50 = 11000 \\
 \quad \underline{31544 \text{ Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (12.) \quad 7550 \times 7 = 52850 \\
 \quad 7550 \times 6 = 45300 \\
 \quad \underline{7550 \text{ Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (13.) \quad 12000 \\
 \quad 131 \times 81 = 10611 \\
 \quad \underline{1389 \text{ Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (14.) \quad 86 \\
 \quad 40 \\
 \hline
 \quad 3440 \\
 \quad 12 \\
 \hline
 \quad 6880 \\
 \quad 3440 \\
 \hline
 41280 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (15.) \quad 50000 \\
 75 \times 64 = 4800 \\
 2525 \times 8 = 20200 \quad 25000 \\
 \hline
 25000 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (16.) \quad 11)3421 \\
 \quad 311 \\
 \hline
 13)2717 \\
 \quad 209 \\
 \hline
 \quad 311 \\
 \hline
 520 \text{ Ans.}
 \end{array}$$

(ART. 56-65, p. 338.)

| | | | |
|------|--|-------|--|
| (1.) | $7637 \div 7 = 1091 \text{ Ans.}$ | (8.) | $ \begin{array}{r} 50000 \\ 15000 \\ \hline 365)35000(95\frac{3}{5} \text{ Ans.} \end{array} $ |
| (2.) | $3379 \div 31 = 109 \text{ Ans.}$ | | $ \begin{array}{r} 3285 \\ \hline 2150 \\ 1825 \\ \hline 325 \end{array} $ |
| (3.) | $40203 \div 9 = 4467 \text{ Ans.}$ | | |
| (4.) | $1547 \div 17 = 91 \text{ Ans.}$ | | |
| (5.) | $8526 \div 294 = 29 \text{ Ans.}$ | | |
| (6.) | $ \begin{array}{r} 18)97648(5424\frac{1}{3} \text{ Ans.} \\ \quad 90 \\ \hline \quad 76 \\ \quad 72 \\ \hline \quad 44 \\ \quad 36 \\ \hline \quad 88 \\ \quad 72 \\ \hline \quad 16 \end{array} $ | (9.) | $1375 \div 31 = 109 \text{ Ans.}$ |
| | | (10.) | $ \begin{array}{r} 485)116400(240 \text{ Ans.} \\ \quad 970 \\ \hline \quad 1940 \\ \quad 1940 \\ \hline \quad 0 \end{array} $ |
| | | (11.) | $596 \div 6 = 99\frac{2}{3} \text{ Ans.}$ |

(12.) 387)57385(148~~188~~ Ans.
$$\begin{array}{r}
 387 \\
 \underline{1868} \\
 1548 \\
 \underline{3205} \\
 3096 \\
 \underline{109}
 \end{array}$$

(14.) 50000

9212

6798)40788(6 Ans.

40788

(15.) 80000

57735

365)22265(61 Ans.

2190

865

865

(16.) 15000

1136

4)13864

3466

1136

Ans. { 4602 A's share.
 { 3466 { B's, C's, and D's
 { shares, each.

(17.)

4004|0)38294256|0(9564 Ans.

36036

22582

20020

25626

24024

16026

16016

(18.) 19400

10600

11|0)880|0

80 Ans.

(ART. 66-75, p. 339.)

(1.) 16756

8867

7889 Ans.

(2.) 1364

304

5456

4092

414656 Ans.

(3.) 438619

30405

469024

134

1876096

1407072

469024

62849216 Ans.

| | | | |
|-------|---|-------|---|
| (4.) | $ \begin{array}{r} 45767 \\ 17 \\ \hline 61 \overline{)04575} 0 \overline{)75} \text{ Ans.} \\ 427 \\ \hline 305 \\ 305 \\ \hline \end{array} $ | (12.) | $ \begin{array}{rcl} \text{Monday} & 95 - 8 = & 87 \\ \text{Tuesday} & 95 - 13 = & 82 \\ \text{Wednesday} & & 95 \\ \text{Thursday} & 95 - 6 = & 89 \\ \text{Friday} & 95 - 13 = & 82 \\ & & \hline & & 5)435 \\ & & \hline & & 87 \text{ Ans.} \end{array} $ |
| (5.) | Dividend Ans. | (13.) | $ \begin{array}{r} 13250 \\ 750 \quad - \\ \hline 2)12500 \\ \hline \text{Ans. } \left\{ \begin{array}{l} 6250 \text{ A's.} \\ 7000 \text{ B's.} \end{array} \right. \end{array} $ |
| (6.) | $ \begin{array}{r} 66)396 \\ 6 \\ \hline 110 \\ 660 \text{ Ans.} \end{array} $ | (14.) | $ \begin{array}{r} 5)4170 \\ \hline 834 \text{ furniture.} \\ 834 \times 4 = 3336 \text{ house.} \end{array} $ |
| (7.) | Ans. 436 | (15.) | $ \begin{array}{r} 23 \\ 17 \\ \hline 40)200 \\ \hline 5 \text{ Ans.} \end{array} $ |
| (8.) | Ans. 3. | | |
| (9.) | Ans. 324. | | |
| (10.) | Ans. 72. | | |
| (11.) | Ans. 17. | | |

(ART. 76-95, p. 340.)

| | | | |
|------|---|------|--|
| (1.) | $ \begin{array}{rcl} 913 \text{ eagles} & = & \$9430.000 \\ 913 \text{ dollars} & = & 943.000 \\ 913 \text{ dimes} & = & 94.300 \\ 913 \text{ cents} & = & 9.430 \\ 913 \text{ mills} & = & .943 \\ & & \hline & & \$10477.673 \text{ Ans.} \end{array} $ | (4.) | $ \begin{array}{rcl} 56 \times 3 \times 30 = & \$50.40 \\ 360) \$50.40 & (\$.14 \text{ Ans.} \\ 360 \\ \hline 1440 \\ 1440 \\ \hline \end{array} $ |
| (2.) | $ \begin{array}{rcl} 48 \times 14 = & \$ 6.72 \\ 128 \times 9 = & 11.52 \\ & \hline & \$18.24 \text{ Ans.} \end{array} $ | (5.) | $ \begin{array}{r} \$7595 \\ 7000 \\ \hline 80) \$595 \\ \hline 73\frac{5}{8} \text{ Ans.} \end{array} $ |
| (3.) | $\$47.50 \div 19 = 250 \text{ Ans.}$ | | |

$$\begin{array}{r} (6.) \quad \$2 \overline{)0\$1248} 0 \\ \underline{624} \\ 2 \\ \underline{1248} \text{ Ans.} \end{array}$$

$$\begin{array}{r} (7.) \quad 294 \overline{) \$85260} (\$290 \text{ Ans.} \\ \underline{588} \\ 2646 \\ \underline{2646} \\ 0 \end{array}$$

$$\begin{array}{r} (8.) \quad \$600 \quad \$7025 \\ \underline{375} \quad \underline{2300} \\ \$225 \overline{) \$4725} (21 \text{ Ans.} \\ \underline{450} \\ 225 \\ \underline{225} \end{array}$$

$$\begin{array}{r} (9.) \quad 365 \times 10 = 3650 \\ .15 + .13 = .28 \\ \underline{29200} \\ 7300 \\ \underline{\$1022.00} \text{ Ans.} \end{array}$$

$$(10.) \quad (\$5.25 \times 40) \div 30 = \$7.00 \text{ Ans.}$$

$$\begin{array}{r} (11.) \\ \$26400 \div 4 = \$6600 \\ \$7650 - \$6600 = \$1050 \\ \$1050 \times 4 = \$4200 \text{ Ans.} \end{array}$$

(12.)

NEW HAVEN, Feb. 24, 1876.

H. E. SMITH,

Bought of OLNEY ROBINSON.

| | | | |
|--|--------------------------------|----|----|
| | 3½ tons coal at \$ 7 | 24 | 50 |
| | 13 lbs. cheese15 | 1 | 95 |
| | 25 lbs. sugar13½ | 3 | 38 |
| | 1 bbl. flour | 12 | 00 |
| | Received payment, | 41 | 83 |
| | OLNEY ROBINSON. | | |
| | \$50 — \$41.83 = \$8.17 Ans. | | |

$$\begin{array}{r} (13.) \\ B, \$1463 + \$1165 = \$2628 \\ A, \$3958 - \$1365 = \$2593 \\ \underline{\$35} \\ \text{Ans. A had \$35 the more.} \end{array}$$

$$\begin{array}{r} (14.) \quad 42 \times 9 = 3.78 \\ .81 \\ 27 \overline{) 4.59} \\ 17 \text{ Ans.} \end{array}$$

(15.) $491 - 29 = 462$

$.95 - .81 = .14$

$\underline{1848}$

$\underline{462}$

$\$64.68, \text{ Ans.}$

(16.)

$\$2280 \div \$40 = 57$

$350 - 57 = 293, \text{ Ans.}$

(18.)

$\underline{.145}$

$\underline{33}$

$\underline{435}$

$\underline{435}$

$\$4.785) \$1339.800 (280, \text{ Ans.}$

$\underline{9570}$

$\underline{38280}$

$\underline{38280}$

$\underline{0}$

(17.)

_____, _____, 18— .

JOHN WOODMAN, of Springfield,

Bought of _____,

| | | | |
|-----------------------------|-----------|-----|----|
| 50 yds. carpet | at \$1.25 | 62 | 50 |
| 5 mats | 4.25 | 21 | 25 |
| 47 yds. oil cloth | .84 | 39 | 48 |
| Received payment, | | 123 | 23 |

(19.)

_____, _____, 18—

JACOB TRUE,

Bought of _____

| | | | |
|------------------------------|--------|----|----|
| 4 cords wood | at \$5 | 20 | 00 |
| 1 ton hay | | 25 | 00 |
| 7 bushels potatoes | .60 | 4 | 20 |
| 8 bbls. apples | 3.25 | 26 | 00 |
| Received payment, | | 75 | 20 |

(ART. 9-129, p. 342.)

- (2.) By factoring. Thus,
 $217 = 7 \times 31$; hence, it is
 a composite number.

- (3.) $35 = 5 \times 7$;
 $85 = 5 \times 17$;
 $5 \times 17 \times 7 = 595$.
 Ans. \$595.

- (4.) $\frac{\cancel{8} \times 25 \times \cancel{4}\cancel{5}}{\cancel{15} \times \cancel{2} \times \cancel{12}} = 25$ Ans.
 $\quad \quad \quad \cancel{4}$

- (6.) $\frac{\cancel{64}\cancel{80}}{\cancel{3} \times \cancel{24}} = .90$ Ans.

- (7.)
 $6 \times 8 \times 9 + 4 = 436$, Ans.

- (9.) $\begin{array}{r} 2) 168, 288, 192, 252 \\ 2) 84, 144, 96, 126 \\ 3) 42, 72, 48, 63 \\ \hline 14, 24, 16, 21 \\ 2 \times 2 \times 3 = 12 \text{ ft. Ans.} \end{array}$

- (10.) $\$9 \times 153 = \1377
 $\$1377 \div (170 \times 81) = \10 , Ans.

- (12.) $\$36 \div 4 = \9
 $(\$9 \times 12) \div \$3 = 36$, Ans.

(ART. 130-156, p. 343.)

- (3.) Ans. Quotient.

- (4.) $\frac{2}{3}$ of 1; $\frac{1}{3}$ of 2.

- (5.) $\frac{15}{12}, \frac{10}{12}, \frac{7}{12}$.

- (6.) $5 = \frac{25}{5}$
 $\frac{25}{5} - \frac{15}{5} = \frac{10}{5} = 2$ Ans.

- (7.)
 $\frac{3}{4} + 1\frac{1}{8} + \frac{17}{16} + 13\frac{7}{16} =$
 $\frac{30}{40} + 1\frac{5}{20} + \frac{170}{40} + 13\frac{28}{40} =$
 $18\frac{33}{40}$ Ans.

- (8.)
 $\frac{3}{8} + \frac{3}{8} = \frac{6}{8} + \frac{3}{8} = \frac{9}{8}$ Ans.

- (9.)
 $\frac{7}{12} - \frac{3}{10} = \frac{420}{660} - \frac{396}{660} = \frac{24}{660}$.
 Ans. The first the faster by
 17 gallons in 260 minutes.

- (10.)
 $\frac{1}{3} + \frac{1}{6} + \frac{1}{8} + \frac{1}{8} =$
 $\frac{40}{120} + \frac{20}{120} + \frac{15}{120} + \frac{15}{120} =$
 $\frac{110}{120}; \frac{110}{120} - \frac{100}{120} = \frac{10}{120} =$
 $\frac{1}{12}$ Ans.

$$\begin{array}{l|l}
 (11.) & 7\frac{3}{4} + 9\frac{1}{2} + 10\frac{1}{2} = \\
 & 7\frac{3}{4} + 9\frac{2}{4} + 10\frac{2}{4} = \\
 & 28\frac{1}{2}; 30 - 28\frac{1}{2} = \\
 & 1\frac{1}{2} \text{ Ans.} \\
 (12.) & \frac{7}{8} \times 5 = 3\frac{5}{8} \text{ Ans.} \\
 (15.) & \frac{3}{8}, \frac{7}{20}, \frac{1}{3} = \\
 & \frac{75}{240}, \frac{84}{240}, \frac{80}{240} \text{ Ans.}
 \end{array}$$

(ART. 157-171, p. 344.)

$$\begin{array}{l|l}
 (2.) & \$\frac{1}{2} \times 425 = \$340 \text{ Ans.} \\
 (3.) & \frac{3}{8} \times \frac{2}{3} \times \frac{1}{4} \times \frac{1}{2} = \\
 & \frac{3 \times 2 \times 1 \times 1}{8 \times 3 \times 4 \times 2} = \frac{1}{32} \text{ Ans.} \\
 (4.) & \\
 & \$60 \times \frac{7}{8} = \$42\frac{3}{4} = \$52\frac{1}{2} \text{ Ans.} \\
 (5.) & 14\frac{3}{4} \div 1\frac{3}{8} = \\
 & \frac{59}{4} \div \frac{11}{8} = \\
 & \frac{118}{11} = 10\frac{8}{11} \text{ Ans.} \\
 (7.) & 19\frac{1}{3} \div 3\frac{7}{8} = \\
 & \frac{37\frac{4}{8}}{19} \div \frac{31}{8} = \\
 & \frac{37\frac{4}{8} \times 8}{19} = \\
 & \frac{296}{19} = 15\frac{11}{19} \text{ Ans.} \\
 (8.) & \frac{\$11\frac{1}{2} \times 8}{5} = \\
 & \frac{92}{5} = \\
 & \frac{\$45 \times 8}{4 \times 5} = \$18 \text{ Ans.} \\
 (9.) & \$5\frac{1}{2} \div \frac{5}{8} = \\
 & \frac{4}{2} = \\
 & \frac{\$11 \times 8}{2 \times 5} = \$8\frac{4}{5} \text{ Ans.} \\
 (10.) & \left(\frac{4\frac{3}{4}}{7} \times \frac{1\frac{2}{3}}{8}\right) \div \frac{15}{20} = \\
 & \left(\frac{4\frac{3}{4}}{7} \times \frac{3}{4}\right) \div \frac{3}{4} = \\
 & \frac{1\frac{3}{4}}{7} \div \frac{3}{4} = \frac{2}{3} \div \frac{3}{4} = \\
 & \frac{2}{3} \times \frac{4}{3} = \frac{8}{9} \text{ Ans.} \\
 (11.) & (12 \times \frac{3}{4}) \div \frac{4}{5} = \\
 & 9 \div \frac{4}{5} = 11\frac{1}{4} \text{ Ans.} \\
 (12.) & \frac{3}{4} \text{ of } \frac{5}{8} = \frac{15}{32}. \\
 & \frac{114}{\$1710 \times 32} = \$3648 \text{ Ans.} \\
 (13.) & \frac{3}{4} \times \frac{5}{8} \times \frac{3}{4} \div 3\frac{1}{2} = \\
 & \frac{2}{3 \times 8 \times 2 \times 5} = \frac{20}{171} \text{ Ans.} \\
 (14.) & 23\frac{3}{4} \div 45 = \\
 & \frac{95}{4} \div 45 = \\
 & \frac{19}{9} = \frac{19}{361} \text{ Ans.}
 \end{array}$$

$$5.) \quad \frac{.80}{\$5.60 \times 8} \$6.40 \text{ Ans.}$$

$$(16.) \quad \frac{2}{22 \times 16} = 32 \text{ Ans.}$$

(ART. 172-174, p. 345.)

$$) \quad 65 - 35 = 30$$

$$\frac{30}{30} = \frac{1}{1} \text{ Ans.}$$

(4.)

$$2\frac{1}{2} \times \frac{7}{9} = \frac{5}{2} \times \frac{7}{9} = \frac{35}{18}$$

$$) \quad \frac{1}{2} = \frac{1}{2}; \frac{1}{2} \text{ of } \frac{4}{9} = \frac{2}{9} \text{ Ans.}$$

$$\frac{6}{7} \div \frac{35}{18} = \frac{6 \times 18}{7 \times 35} = \frac{108}{245} \text{ Ans.}$$

(3.)

$$\begin{aligned} \$85 - \$80\frac{1}{4} &= \$4\frac{3}{4} = \$1\frac{12}{16} \\ \frac{17}{4} \times \frac{3}{8} &= \$\frac{51}{32} = \$2\frac{11}{32} \text{ Ans.} \end{aligned}$$

$$(5.) \quad \begin{aligned} 1\frac{11}{17} &= \frac{28}{17} = \frac{168}{102} \\ \frac{168}{102} - \frac{108}{102} &= \frac{60}{102} \\ \frac{60}{102} \div \frac{108}{102} &= \frac{60}{108} = \frac{5}{9} \text{ Ans.} \end{aligned}$$

$$) \quad 14\frac{7}{8} = 17\frac{1}{2}; 5\frac{3}{8} = 13\frac{7}{8}$$

$$\frac{104 \times 14 \times 17}{7 \times 13 \times 3} = 90\frac{2}{3} \text{ cents Ans.}$$

$$) \quad 31\frac{1}{8} = 15\frac{1}{2}$$

$$\begin{aligned} \frac{156 \times 8}{5 \times 3} &= 4\frac{1}{5} \\ 4\frac{1}{5} &= 83\frac{1}{5} \text{ ft. Ans.} \end{aligned}$$

$$) \quad \frac{12\frac{3}{4} \times 27\frac{1}{2}}{18\frac{3}{4}} = 25\frac{1}{2} \text{ Ans.}$$

$$) \quad \$10\frac{3}{4} = \$14; \frac{\$54 \times 13}{5 \times \frac{4}{2}} = \$351.$$

$$\begin{aligned} \$75\frac{3}{4} &= \$122; \frac{303}{4} \div \frac{351}{10} = \\ \frac{303 \times 10}{4 \times 351} &= \frac{3030}{1404} = 2\frac{37}{34} \text{ Ans.} \end{aligned}$$

- (10.) $\frac{3}{4} = \frac{4}{5}$; $\frac{4}{5} - \frac{4}{5} = \frac{1}{5}$.
 $70 - 20 = 50 \text{ gal.} = \frac{1}{5}$.
 $50 \text{ gal.} \times 6 = 300 \text{ gal. Ans.}$
- (11.) $\frac{2}{3}$ of 4 = $\frac{8}{3}$; $\frac{3}{4}$ of 2 = $\frac{3}{2}$.
 $\$5\frac{1}{3} = \$1\frac{2}{3}$.
 $\frac{\$16 \times 4 \times 3}{3 \times 8 \times 2} = \4 Ans.
- (12.) $2\frac{3}{4} = 1\frac{1}{2}$; $\frac{7}{12}$ of $1\frac{1}{2} = \frac{7}{8}$.
 $3 = \frac{1}{1} = 1\frac{4}{8}$. $77 \div 144 = \frac{77}{144} \text{ Ans.}$
- (13.) $9 + 16 = 25$; $\frac{2}{5}$ of \$275 =
 $\frac{2}{5}$ of \$275 = \$99, worth of horse.
 $\frac{1}{2}$ of \$275 = \$176, worth of chaise.
- (14.) $\frac{4}{5}$ of his income saved annually for 5 years is equal to 5 times $\frac{4}{5}$, or $2\frac{4}{5}$ of his income.
 $2\frac{4}{5}$ and $\frac{2}{3}$ are equal to $\frac{7}{4}$ and $\frac{1}{2}$.
The difference between $\frac{7}{4}$ and $\frac{1}{2}$, or $\frac{5}{4}$, of his income is \$1300; hence, his income is $\frac{4}{5}$ of \$1300, or \$528 $\frac{4}{5}$.
- (15.) $\frac{5}{4} = 1\frac{1}{4}$. The difference between $\frac{3}{4}$ and $1\frac{1}{4}$, or $\frac{1}{2}$, of his money is \$5.
If $\frac{5}{8}$ of his money is \$5, $\frac{1}{8}$ is \$1, and the whole of his money, or $\frac{8}{8}$, is \$8.

(Art. 175-191, p. 346.)

- | | | | |
|------|---|------|---|
| (2.) | 5.0009 3000005.080039 <hr/> 3000010.080939 Ans. | (6.) | 30000.000 .031 <hr/> 29999.969 Ans. |
| (5.) | 5.35 3.0375 11.045 7.03125 <hr/> 26.46375 Ans. | (7.) | $4\frac{7}{8} = 4.875$ $.01375 = \frac{1}{80}$ $4\frac{7}{8} = 4.875$ $4\frac{7}{8} + \frac{1}{80} = 4.8875$ $4.875 + .01375 = 4.88875$ } <div style="text-align: right;">Ans.</div> |

| | |
|---|---|
| $\begin{array}{r} 3\frac{3}{4} = 3.666 + \\ 4\frac{3}{4} = 4.552 + \\ \hline 51.652 \\ 59.870 + \text{ Ans.} \end{array}$ | $\begin{array}{l} (10.) \quad \left. \begin{array}{l} \frac{2}{27} = 0.29\bar{6} \\ \frac{1}{2} = 0.152\bar{7} \\ \frac{1}{2}\frac{8}{9} = .647\bar{2} \end{array} \right\} \text{Ans.} \\ (12.) \quad .0357 = \frac{357}{10000}, \text{ Ans.} \end{array}$ |
| $\begin{array}{l} 08 = \frac{8}{100} = \frac{2}{25} \\ 05\frac{1}{2} = \frac{11}{20} = \frac{11}{20} \\ 015625 = \frac{15625}{1000000} = \frac{1}{64} \\ 3148 = \frac{3148}{10} = \frac{1}{34} \end{array}$ | $\begin{array}{r} (13.) \quad \begin{array}{r} 15.000103 \\ 103.015 \\ 115. \\ \hline 233.015103 \\ 99.1868 \\ \hline 133.828303, \text{ Ans.} \end{array} \end{array}$ |

(ART. 192-196, p. 347.)

| | |
|--|--|
| $\begin{array}{r} 3.01 \\ .002 \\ \hline .00602 \end{array}$ <p>ns. Six hundred two hundred thousandths.</p> $\begin{array}{r} 4.8 \times .09 = .432 \\ .432 \div .016 = 27, \text{ Ans.} \end{array}$ $\begin{array}{r} 365.250000 \\ 365.242264 \\ \hline .007736 \\ 1876 \\ \hline 46416 \\ 54152 \\ 61888 \\ 7736 \\ \hline 14.512736, \text{ Ans.} \end{array}$ | $\begin{array}{l} (4.) \quad \begin{array}{r} 2000 \quad 2000 \\ .03 \quad .175 \\ \hline 600.0 \quad 350.000 \\ 600 + 350 = 950. \\ 2000 - 950 = 1050. \\ \text{Ans. Men 600, women 375,} \\ \text{children 1050.} \end{array} \\ (5.) \quad \begin{array}{r} .0625 \times 3 = .1875. \\ .0715 \times 4 = .2860 \\ \hline .4735 \\ .4735)30.7775(65 \text{ days, Ans.} \\ 28410 \\ \hline 23675 \\ 23675 \\ \hline \end{array} \end{array}$ |
| | $\begin{array}{l} (6.) \\ 11.035 \times .0008 = .008828 \\ .19 \times .003 = .000639 + \\ \text{Ans. The former by .008189} + \end{array}$ |

(7.)

$$\begin{array}{r} 6 \\ 162 \times 90 \\ \hline 75 \\ 5 \end{array} = 194\frac{2}{5} \text{ Ans.}$$

(9.)

$$\begin{aligned} \$3.75 \div .6875 &= \$5.4545 + \\ \$5.4545 + \times 40.25 &= \\ \$219.54 + &\text{ Ans.} \end{aligned}$$

(10.)

$$68.25 \div 2.3 = 27.5 \text{ days Ans.}$$

(12.)

$$\begin{array}{r} 12.75 \\ 7.75 \\ \hline 6375 \\ 8925 \\ 8925 \\ \hline 98.8125 \\ 12\frac{5}{8} \\ \hline 1976250 \\ 988125 \\ \hline 617578\frac{1}{8} \\ \hline 124.75078\frac{1}{8} \end{array}$$

Ans. \$124.75.

(13.)

$$\begin{aligned} \$12.38 \div 248 &= \$0.04991935 \\ \$12.38 - \$8.50 &= \$3.88 \\ \$3.88 \times 5 &= \$19.40 \text{ Ans.} \end{aligned}$$

(14.)

$$\begin{array}{r} \$15\frac{1}{2} \\ 8 \\ \hline 127 \\ 25.42 \\ \hline 254 \\ 508 \\ 635 \\ 254 \\ \hline \$3228.34 \text{ Ans.} \end{array}$$

(15.)

$$\begin{aligned} .45 + .25 &= .70. \\ 1.00 - .70 &= .30 \\ \$500 \div .30 &= \$1666.66 + \text{A} \end{aligned}$$

(16.)

$$\begin{aligned} 1.875 \times 13 &= 24.375 \\ 24.375 \times 7.5 &= 182.81\frac{1}{4} \text{ A} \end{aligned}$$

(17.)

$$\begin{array}{r} 1.00 - .20 = .80 \\ 1.00 - .75 = .25 \\ \hline .55 \\ 12 \text{ gal.} \div 55 = 21.81\frac{9}{11} \text{ gal. A} \end{array}$$

(18.)

$$\begin{aligned} 31.5 \times \frac{1}{2} &= 19.5 \\ \$4.25 \times 31.5 &= \$133.87 \\ \$6.80 \times 19.5 &= \$132.60 \\ \hline \text{Ans. } \$1.27\frac{1}{2} \end{aligned}$$

(ART. 197-250, p. 348.)

-) 4 m.
 320
 1280 rd.
 16½
 7680
 1280
 640
 21120 ft.
 12
 42240
 21120
 253440 in. Ans.
-) 4)2277
 63)569 . . 1 qt.
 9 hhd. 2 gal.
 Ans. 9 hhd. 2 gal. 1 qt.
- .) 1½ m. = 480 rd.
 480 × 4 = 1920 sq. rd.
 1920 ÷ 160 = 12 A.
- .) 17 lb. 5 oz. 12 pwt.
 12
 54
 17
 5
 209 oz.
 20
 4180
 12
 4192 pwt.
 4192 ÷ 16.375 = 256 Ans.
 14*

- (5.) 42 gal. 2 qt. = 340 pt.
 340 ÷ 1½ = 255 Ans.

(6.)

$$1 \text{ lb.} = .4536 \text{ kilogram}$$

$$33\frac{1}{3} \times .4536 = 15 + \text{cents.}$$

- (7.) .0007 m.
 .320
 .224 rd.
 5½
 1120
 112
 12.32 yd.
 3
 .96 ft.
 12
 192
 96
 11.52 in.
 Ans. 12 yd. 0 ft. 11.52 in.

(8.)

$$\frac{7}{8} \text{ cwt.} = \frac{7}{8} \times 100 = 77\frac{1}{2} \text{ lb.}$$

$$\frac{7}{8} \text{ lb.} = \frac{7}{8} \times 16 = 12\frac{1}{2} \text{ oz.}$$

$$\frac{4}{8} \text{ oz.} = \frac{4}{8} \times 16 = 7\frac{1}{2} \text{ dr.}$$

Ans. 77 lb. 12 oz. 7½ dr.

- (9.) Principal units of the Metric
 System are —
 The meter, the are, the liter,
 and the gram.

- (10.) June has 30 days
 July has 31 days
 August has 31 days

92 days

$$92 \times 24 \times 60 = 132480 \text{ min.}$$

(11.)

$$100 \text{ ft. sq.} = 100' \times 100 = 10000 \text{ square feet.}$$

$$2 \text{ A.} = 2 \times 43560 =$$

$$87120 \text{ square feet.}$$

$$\frac{19999}{37120} = \frac{125}{1089} \text{ Ans.}$$

- (12.) 1 gal. = 3.786 liters

$$.84 \times 3.786 = \$3.18 +.$$

(13.)

$$1 \text{ ft. by } 1 \text{ ft. } 8 \text{ in.} = 1\frac{2}{3} \text{ sq. ft.}$$

$$70 \text{ ft.} \times 18 \text{ ft.} = 1260 \text{ sq. ft.}$$

$$1260 \div 1\frac{2}{3} = 756 \text{ Ans.}$$

(14.)

$$10 \times 10 \times 10 = 1000 \text{ cu. in.}$$

$$5 \times 5 \times 5 = 125 \text{ cu. in.}$$

$$1000 \div 125 = 8 \text{ Ans.}$$

(15.)

$$30 \text{ rd. sq.} = 30 \times 30 =$$

$$900 \text{ sq. rds.}$$

$$900 \div 160 = 5\frac{5}{8} \text{ A.}$$

$$\$50 \times 5\frac{5}{8} = \$281.25.$$

$$15 \text{ rd. sq.} = 15 \times 15 =$$

$$225 \text{ sq. rds.}$$

$$(225 \times 2) 160 = 2\frac{1}{8} \text{ A.}$$

$$\$50 \times 2\frac{1}{8} = \$140.62\frac{1}{2}.$$

(16.)

$$80 \times 12 \times 10 = 9600 \text{ cu. ft.}$$

$$9600 \div 128 = 75 \text{ cords.}$$

$$\$5.25 + \$1 + \$75 = \$7.00.$$

$$\$8 - \$7 = \$1. =$$

$$\$1 \times 75 = \$75.$$

(17.)

$$281.16 \div .11 = 2556 \text{ lb.}$$

$$2556 \text{ lb.} = 1 \text{ T. } 556 \text{ lb.}$$

(18.)

$$9 \text{ weeks} = 63 \text{ days.}$$

$$63 \times 8 \times 36 = 18144 \text{ qt.}$$

$$18144 \div 32 = 567 \text{ bu.}$$

$$(19.) \quad \frac{8}{27} \div \frac{36}{36} = \frac{8}{36}.$$

- (20.) 1 mile = 1.6093 kilometers.

$$1.6093 \times 36 = 57.9348 \text{ kilometers.}$$

- (21.) 48 Tons 15 cwt. 47 lb. = 97547 lb.

$$97547 \times .02 = \$1950.94$$

$$\$1950.94 \div 380 = \$5.13 +.$$

- (23.) 1 hectare = 2.471 acres.

$$1 \text{ hectoliter} = 2.837 \text{ bushels.}$$

$$2.837 \times 13\frac{1}{3} = 37.8266 + \text{ bu.}$$

$$37.8266 + \div 2.471 = 15.3 + \text{ bu.}$$

-) $(200 + 180) \times 5\frac{1}{2} = 2090 \text{ sq. ft.}$
 $(2090 \div 9) \times \$10 = \$23.22 +$
-) 1 bushel = 2150.42 cu. in.; 1 liq. qt. = 57.75 cu. in.
 $2150.42 \times 5 = 10752.1 \text{ cu. in.}; \$5 \times 5 = \$25.$
 $10752.1 \div 57.75 = 186.7 + \text{liq. qt.}; 186.7 \times .20 =$
 $\$37.34. \$37.34 - \$25 = \$12.34, \text{ Ans.}$

(ART. 251-261, p. 350.)

| T. | cwt. | lb. |
|----|------|-----|
| 41 | 5 | 65 |
| 35 | 9 | 83 |
| 76 | 15 | 48 |

| gal. | qt. | pt. | gi. |
|------|-----|-----|-----|
| 40 | 3 | 1 | 0 |
| 18 | 3 | 1 | 2 |
| 21 | 3 | 1 | 2 |

| A. | P. |
|----|----------------|
| 2 | 65 |
| | $5\frac{3}{4}$ |
| 12 | 5 |
| | 1 128.75 |
| 13 | 133.75 |

(4.)

$$1\frac{1}{2} \text{ pt.} = 1\frac{1}{2} \div 2 = .77 + \text{qt.}$$

$$1.77 \text{ qt.} = 1.77 \div 8 = .22 + \text{pk.}$$

$$2.22 \text{ pk.} = 2.22 \div 4 = .55 + \text{bu.}$$

$$\$3.60 \times 30.55 = \$109.98.$$

(5.)

| T. | cwt. |
|------|---------|
| 164 | 8 |
| 83 | 16 |
| 4)80 | 12 |
| 20 | 3 |
| 60 | 9, Ans. |

(6.)

$$2 \text{ sec.} = 2 \times 15 = 30''$$

$$3 \text{ m.} = 3 \times 15 = 45'$$

$$8 \text{ h.} = 8 \times 15 = 120^\circ$$

$$\text{Ans. } 120^\circ 45' 30''.$$

1 U. S. Standard bushel = 2150.42 cu. in.

$$12 \times 4 \times 3\frac{1}{2} = 168 \text{ cu. ft.}$$

$$1728 \times 168 = 290304 \text{ cu. in.}$$

$$290304 \div 2150.42 = 134.99 + \text{bu.}$$

$$31 - 16 = 15. \quad 15 + 30 + 31 + 31 + 30 + 31 +$$

$$30 + 31 + 31 + 29 + 1 = 290 \text{ days, Ans.}$$

- (9.) $67^{\circ} 21' + 18^{\circ} 24' = 85^{\circ} 45'$.
 $85^{\circ} 45' = 5 \text{ h. } 43 \text{ min.}$
 $5 \text{ h. } 43 \text{ min. earlier than } 2 \text{ h. } 36 \text{ min. A. M.} =$
 $8 \text{ h. } 53 \text{ min. P. M.}$

(10.) Ans. Sunday.

(11.)

| A. | p. | sq. yd. | sq. ft. |
|-------|----|---------|---------|
| 3 | 47 | 18 | 2 |
| <hr/> | | | |
| | | | 4 |

$$\begin{array}{r} 7) 13 \quad 30 \quad 11\frac{1}{2} \quad 8 \\ \hline 1 \quad 141 \quad 12 \quad 8\frac{1}{2} \end{array} \text{ Ans.}$$

(12.)

10 bu. 3 pk. 5 qt. =
 10.90625 bu.

$$\$64 \times 10.90625 = \$698.$$

$$\$15 \times 4 = \$60; \$698 \div \$60 = 11.63 \frac{1}{3}, \text{ Ans.}$$

T. cwt. lb.

(13.) $\begin{array}{r} 0 \quad 16 \quad 28 \\ \hline 4 \\ 3) 3 \quad 5 \quad 12 \\ \hline 1 \quad 1 \quad 71\frac{2}{3} \end{array} \text{ Ans.}$

(ART. 262-287, p. 351.)

(1.)

$$\$1000 \times 1.20 = \$1200.00$$

$$\$250 \times 1.15 = 287.50$$

$$\text{Ans. } \$912.50$$

(2.)

$$\$4 - \$2.50 = \$1.50$$

$$\$4 - \$2.50 = \$1.50$$

$$\$1.50 \div \$2.50 = .60 \text{ gain, } \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{ Ans.}$$

$$\$1.50 \div \$4 = .37\frac{1}{2} \text{ loss, } \left. \begin{array}{l} \\ \\ \end{array} \right\}$$

(14.)

6 reams 13 quires 10 sheets :

$6.671\frac{1}{4}$ reams.

$$\$4 \times 6.671\frac{1}{4} = \$26.68\frac{1}{2} \text{ A}$$

(15.) $\begin{array}{r} \text{o} \quad \text{' } \quad \text{" } \\ 122 \quad 26 \quad 48 \\ \hline 71 \quad 3 \quad 30 \end{array}$

$$\begin{array}{r} 15) 51 \quad 23 \quad 18 \\ \hline 3 \quad 25 \quad 33.2 \end{array}$$

Noon, December 31, 1875,

h. min. sec.

$$\text{less } 3 \quad 25 \quad 33.2$$

$$= 12 \quad 0 \quad 0$$

$$3 \quad 25 \quad 33.2$$

$$8 \quad 34 \quad 26.8$$

34 min. 26.8 sec. past 8 o'clock

A. M. Dec. 31, 1875 Ans.

(3.)

$$.55 - .24 = .31$$

$$60.25 \div .31 = 194.35\frac{1}{4} \text{ A}$$

(4.) $.15) \$65.00 (\$433\frac{1}{3} \text{ A}$

$$60$$

$$50$$

$$45$$

$$50$$

$$45$$

$$5$$

(5.)

$$\begin{aligned} \$15 \div .90 &= \$16\frac{2}{3} \\ \$16\frac{2}{3} \times 1.15 &= \$19.16\frac{2}{3} \text{ Ans.} \end{aligned}$$

(6.)

$$\begin{array}{r} 150 \div 2 = 75 \text{ cents.} \\ 150 \div 3 = 50 \text{ cents.} \\ 5 \overline{)300} \qquad \underline{125} \\ 60 \times 2 = 120 \end{array}$$

loss 5 cents.

$$5 \div 125 = .04, \text{ or } 4\% \text{ Ans.}$$

(7.)

$$\begin{aligned} 100\% + 25\% &= 125\% \\ 25\% \text{ of } 125\% &= 31\frac{1}{4}\% \\ 125\% - 31\frac{1}{4}\% &= 83\frac{3}{4}\% \\ 100\% - 83\frac{3}{4}\% &= 16\frac{1}{4}\% \\ \text{Ans. } 16\frac{1}{4}\% \text{ lost.} \end{aligned}$$

(9.)

$$\begin{aligned} \frac{3}{4} \text{ of } \$2400 &= \$1600 \\ \$1600 \times .02\frac{1}{2} &= \$40. \\ \$40 + \$1 &= \$41 \text{ Ans.} \end{aligned}$$

(10.)

$$\begin{aligned} \$1000 \div 1.05 &= 952.38\frac{2}{7} \\ \$1000 \div 952.38\frac{2}{7} &= \$47.61\frac{1}{2} \\ \$50 - \$47.61\frac{1}{2} &= \$2.38\frac{2}{7} \text{ Ans.} \end{aligned}$$

(11.)

$$\begin{aligned} 2000 \div .01\frac{1}{2} &= \$30. \\ \$30 - \$25 &= \$5; \$\frac{5}{25} = .20. \\ \text{Ans. } 20 \text{ per cent.} \end{aligned}$$

(12.)

$$\begin{aligned} .10 + .15 &= .25; \\ 1.00 - .25 &= .75 \\ 18 \div .75 &= 24 \text{ Ans.} \end{aligned}$$

(13.)

$$\begin{aligned} \$994 \div .035 &= \$28400 \\ \$28400 \times \frac{3}{4} &= \$42600 \text{ Ans.} \end{aligned}$$

(14.)

$$\begin{aligned} 37 + 3 &= 40. \\ \frac{3}{4} = .92\frac{1}{2}; \frac{3}{40} &= .07\frac{1}{2}. \\ \text{Ans. Silver, } 92\frac{1}{2}\%; \text{ copper, } 7\frac{1}{2}\%. \end{aligned}$$

(15.)

$$\begin{aligned} 2000 \times \$.24 &= \$480. \\ \$480 \times .95 &= \$456. \\ \$456 \times .97\frac{1}{2} &= \$444.60 \text{ Ans.} \end{aligned}$$

$$\begin{aligned} (16.) \quad \$2400 + \frac{1}{5} &= \$1500. \\ \$1500 \times .00\frac{2}{3} &= \$6. \\ \$2400 - \$1500 + \$6 &= \$906 \text{ Ans.} \end{aligned}$$

$$\begin{aligned} (17.) \quad 35 \times 15 &= 525; \$4.25 \times 525 = \$2231.25; \\ \$2231.25 \times 1.25 &= \$2789.06\frac{1}{4} \\ \$2789.06\frac{1}{4} \div 525 &= \$5.31\frac{1}{4} \text{ Ans.} \end{aligned}$$

- (18.) $\$603.75 \div 1.05 = \$575.$
 $\$575 \div \$5 = \$115$ Ans.
- (19.) $\$675 \times .75 = \506.25
 $\$506.25 \times .95 = \$480.93\frac{1}{2}$ Ans.
- (20.) $\$34 \times 51 = \1734.00
 $\$5 \times 100 = 500.00$
 200.00
 $\$1000 \div 12 = 83.33\frac{1}{3}$
 1500.00
 $\$4017.33\frac{1}{3}$
 $\$4017 \times 1.10 = \$4419.06\frac{2}{3}$
 $\$4419.06\frac{2}{3} \div 50 =$
 $\$88.38\frac{2}{15}$ Ans.

(ART. 288-304, p. 353.)

- (1.) $\$670 \times .06 = \40.20
 Int. for 6 mo. = 20.10
 " " 20 d. = $2.23\frac{1}{3}$
 Ans. $\$62.53\frac{1}{3}$
- (2.) Amount of \$1 for 1 yr. 8 mo. = \$1.10
 $\$112 \div \$1.10 = \$101.818 +$
- (3.)

| | | |
|-------|-----|----|
| yr. | mo. | d. |
| 1877 | 4 | 16 |
| 1876 | 6 | 4 |
| <hr/> | | |
| 10 | 12 | |

 Principal $\$104.50$
 Int. for 10 mo. = $\frac{1}{20}$ of prin. = 5.225
 " " 12 d. = $\frac{1}{20}$ of prin. = 0.209
 Ans. $\$5.434$

(5.)

| yrs. | mo. | d. |
|-------|-----|----|
| 1876 | 7 | 10 |
| 1875 | 3 | 20 |
| <hr/> | | |
| 1 | 3 | 21 |

| | |
|-----------------------|---------------|
| Principal | \$875 |
| | <u>.06</u> |
| Int. for 1 yr. | \$52.50 |
| “ “ $\frac{1}{4}$ yr. | 13.125 |
| “ “ 21 d. | <u>3.0625</u> |
| Ans. | \$68.6875 |

(6.)

| | |
|-----------------|---------------------------------------|
| Principal | \$86750 |
| | <u>.07</u> |
| | \$6072.50 |
| | <u>2</u> |
| Int for 2 yr. = | \$12145.00 |
| “ “ 6 mo. = | 3036.25 |
| “ “ 15 d. = | <u>253.02$\frac{1}{2}$</u> |
| | \$15434.27 $\frac{1}{2}$ |
| | <u>86750.00</u> |
| | \$102184.27 $\frac{1}{2}$ Ans. |

(7.)

Int. of \$165 for 1 yr. = \$9.90

$\$14.85 \div \$9.90 = 1.5$

1.5 yr. = 1 yr. 6 mo. Ans.

(8.)

$\$336.42 - \$311.50 = \$24.92$

Int. of \$311.50 at 1 % = $\$4.15\frac{1}{2}$

$\$24.92 \div \$4.15\frac{1}{2} = 6$ Ans.

(9.)

$\$75 - \$50 = \$25.$

Int. of \$50 for 1 yr. = \$3.

$\$25 \div \$3 = 8\frac{1}{3}.$

Ans. $8\frac{1}{3}$ years, or 8 yr. 4 mo.

(10.) Amount of \$1 = \$1.24,
 \$477.71 \div \$1.24 = 385.25
 Aus. \$385.25.

(11.) Int. of \$1 for $3\frac{1}{2}$ yr. = \$.28
 \$5.11 \div .28 = 18.25 Ans.

(12.) Int. of \$ = \$1.785
 \$2275 \times .1785 = \$406.0875
 \$406.875 + \$2275 = \$2681.0875 Ans.

(13.) Amount of \$1. = \$1.035.
 1.035)\$5000.000000(\$4830.917 +
 4140
 8600
 8280
 3200
 \$5000.000 3105
 483.917 + 3105
 \$169.083 + 9500
 9315
 1850
 \$5000 1035
 .03 $\frac{1}{2}$ 1035
 175.000 8150
 169.083 + 7245
 \$5.917 Ans. 905

- 14.) Feb. 16 + 7 mo. = Sept. $1^6|_{19}$
 July 8 to Sept. 19 = 2 mo. 11 d.;
 and 3 days grace = 2 mo. 14 d.
 Bank discount of \$1000 = $\$1000 \times .01028 +$
 $= \$10.28.$
 True discount = $\$1000 - (1000 \div 1.01028 +);$
 $1.01028 +) \$1000.0000000 (\$989.82 +$
 $\quad 909252$
 $\quad \underline{907480}$
 $\quad 808224$
 $\quad \underline{992560}$
 $\quad 909252$
 $\quad \underline{833080}$
 $\quad 808224$
 $\quad \underline{247560}$
 $\quad 202056$
 $\quad \underline{45504}$
 $\$1000 - \$989.82 + = \$10.18$
 $\$10.28 - \$10.18 = \$0.10 \text{ Ans.}$

(ART. 305-319, p. 354.)

- (2.) July 19, 1876 + 6 mo. 3d.
 $= \text{January } 1^9|_{22}, 1877 \text{ Ans.}$
- (3.) Due Oct. $8|_9, 1876$
 Time to run, 26 days.
- (4.) Discount of \$500 = \$7.75
 $\$500 - \$7.75 = \$492.25 \text{ Ans.}$
- (5.) Principal \$560.00
 Int. 8 mo. 6 d. 22.96
 15

| | | |
|---------------------------|---------------|---------------|
| Amount, | | \$582.96 |
| 1st payment, | \$125.00 | |
| Int. for 1 mo. 21 d. | 1.06 | + |
| 2d payment, | <u>130.00</u> | <u>256.06</u> |
| Balance due May 13, 1876, | | \$326.90 |

(6.) \$250 _____ January 15, 1876.

For value received, I promise to pay Alden Benson, or order, two hundred fifty dollars, on demand, with interest.
JAMES DOYLE.

Indorsements:— March 1, 1876, \$75; July 5, 1876, \$50; September 8, 1876, \$1.

| | | |
|---------------------------|-------------|------------------|
| Principal | | \$250.000 |
| Int. for 11 mo. 15 d. | | <u>14.416</u> |
| | | \$264.416 |
| 1st payment, | \$75.00 | |
| Int. for 10 mo. | 3.75 | |
| 2d payment, | 50.00 | |
| Int. for 5 mo. 26 d. | 1.466 | |
| 3d payment, | 1.000 | |
| Int. for 3 mo. 23 d. | <u>.018</u> | <u>\$131.234</u> |
| Balance due Jan. 1, 1877, | | \$133.182 |

(7.) Face of note, \$560; discount on \$560 for 63 days at 7%
= \$6.859; proceeds = \$560.000 — \$6.859
= \$553.141 Ans.

| | | | |
|-------|---|--------------|------|
| (8.) | Principal, | \$800 | |
| | | .06 | |
| | Int. for 1st year, | \$48.00 | |
| | | 800 | |
| | Amount for one year, | \$848 | |
| | | .06 | |
| | Int. for 2d year, | \$50.88 | |
| | | 848. | |
| | Amount for 2 years, | \$898.88 | |
| | | .06 | |
| | Int. for 3d year, | \$53.9328 | |
| | | 898.88 | |
| | Amount for 3d year, | \$952.8128 | |
| | | .03 | |
| | Int. for 3 mo., | \$28.584384 | |
| | | 952.8128 | |
| | Amount for 3 yr. 6 mo. | \$981.397184 | |
| | | 800 | |
| | Compound Int. for 3 years, | \$181.397 + | Ans. |
| (9.) | Bank discount for 6 mo. 3 d. = \$.0305. | | |
| | \$1 — \$.0305 = \$.9695, proceeds of \$1 for 6 mo. 3 d. | | |
| | \$500 ÷ \$.9695 = \$515.729 face of the note Ans. | | |
| (10.) | Principal, | \$1340.500 | |
| | Int. to July 30, 1877, 1 yr. 3 mo. 18 d. | 121.985 | |
| | Amount, | \$1462.485 | |
| | Payment, July 30, 1877, | 684. | |
| | New principal, | \$778.485 | |
| | Int. to April 18, 1878, 8 mo. 19 d. | 39.205 | |
| | Amount due April 18, 1878, | \$817.690 | Ans. |

- (11.) Bank discount of \$1 for 4 mo. 3 d. at 6% = \$.0205.
 \$1 — \$.0205 = \$.9795 proceeds of \$1.
 $\$239.75 \div \$.9795 = \$244.767$, face of note, Ans.

| | |
|---------------------|-----------------------|
| (12.) Principal, | \$950.50 |
| | <u>.07</u> |
| Int. for 1 year, | \$66.5350 |
| | <u>950.50</u> |
| Amount for 1 year, | \$1017.0350 |
| | <u>.07</u> |
| Int. for 2d year, | \$71.192450 |
| | <u>1017.035</u> |
| Amount for 2 years, | \$1088.22745 |
| | <u>.07</u> |
| Int. for 3d year, | \$76.1759215 |
| | <u>1088.22745</u> |
| Amount for 3 years, | \$1164.4033715 |
| | <u>.07</u> |
| Int. for 4th year, | \$81.508236005 |
| | <u>1164.4033715</u> |
| Amount for 4 years, | \$1245.911607505 Ans. |

- (13.) Amount of \$1 for 18 mo. at $4\frac{1}{2}\%$ = \$1.0675.
 $\$465 \div \$1.0675 = \$435.595$, present worth.
 $\$465 - \$435.597 = \$29.403$, true discount.
 $\$465 \times .04\frac{1}{2} = \20.925 , interest for 1 year, or 12 months.
 $\$20.925 \times 1\frac{1}{2} = \$31.387\frac{1}{2}$, interest for 18 months.
- | | |
|--------------------|------------------------------------|
| Principal, | \$465.00 |
| | <u>.02$\frac{1}{4}$</u> |
| | \$9.3000 |
| | <u>1.1625</u> |
| Int. for 1st 6 mo. | \$10.4625 |
| | <u>465</u> |
| 2d principal, | \$475.4625 |
| | <u>.02$\frac{1}{4}$</u> |
| | \$9.509250 |
| | <u>1.188656 +</u> |
| Int. for 2d 6 mo. | 10.697906 |
| | <u>475.4625</u> |
| 3rd principal, | \$486.1604 + |
| | <u>.02$\frac{1}{4}$</u> |
| | \$9.723208 |
| | <u>1.215401</u> |
| Int. for 3d 6 mo. | \$10.938609 |
| | <u>486.1604</u> |
| Amount, | \$497.099 + |
| | <u>465.</u> |
| Compound Int. | \$32.099 |
- Ans. True discount, \$29.40 +; simple interest, \$31.38 $\frac{3}{4}$;
 compound interest, \$32.099 +.

(ART. 320-352, p. 355.)

- (1.) 1200 men + 800 men = 2000 men.
 2000 : 1200 :: 15 mo. : 9 Ans.

$$(2.) \quad 2000 \text{ lb.} \times .078 = 156 \text{ lb.}$$

$$56 \text{ lb.} : 156 \text{ lb.} :: \$15.68 : \$43.68 \text{ Ans.}$$

$$(4.) \quad 7\frac{1}{2} : 85 :: 6 : 68 \text{ Ans.}$$

$$(5.) \quad 8 : 14\frac{2}{3} :: 18 : 32 \text{ Ans.}$$

$$(7.) \quad 12 + 10 + 30 + 48 = 100.$$

$$\text{A's stock} = \frac{12}{100} = \frac{3}{25}$$

$$\text{B's " } = \frac{10}{100} = \frac{1}{10}$$

$$\text{C's " } = \frac{30}{100} = \frac{3}{10}$$

$$\text{D's " } = \frac{48}{100} = \frac{12}{25}$$

Hence,

$$\text{A's share} = \frac{3}{25} \text{ of } \$80 = \$9.60$$

$$\text{B's " } = \frac{1}{10} \text{ " } = 8.00$$

$$\text{C's " } = \frac{3}{10} \text{ " } = 24.00$$

$$\text{D's " } = \frac{12}{25} \text{ " } = \underline{38.40}$$

$$\$80.00$$

$$(8.) \quad 9 \text{ days} : 12 \text{ days} :: 15 \text{ men} : 20 \text{ men}$$

$$20 - 15 = 5 \text{ men Ans.}$$

$$(9.) \quad 1000 + 1200 = 2200$$

$$\text{A's stock} = \frac{1200}{2200} = \frac{6}{11}$$

$$\text{B's " } = \frac{1000}{2200} = \frac{5}{11}$$

Hence,

$$\text{A's share} = \frac{6}{11} \text{ of } \$200 = \$90\frac{10}{11}$$

$$\text{B's " } = \frac{5}{11} \text{ " } = \underline{90\frac{10}{11}}$$

$$\$200$$

$$(10.) \quad 15 : 20 :: 140 \text{ miles} : 248\frac{2}{3} \text{ miles Ans.}$$

$$9 : 12$$

$$(11.) \quad 0 \text{ days} \times 200 = 0 \text{ days}$$

$$244 \text{ " } \times 350 = 85400 \text{ "}$$

$$456 \text{ " } \times 500 = \underline{228000 \text{ "}}$$

$$\begin{array}{r} 1050 \end{array}) \underline{313400 \text{ "}}$$

$$298 \text{ days.}$$

$$\text{Jan. 1, 1876} + 298 \text{ days} = \text{Oct. 26, 1876 Ans.}$$

- (12.) A's \$2400 for 8 mo. = \$19200 for 1 mo.
 B's \$5600 for 5 mo. = 28000 for 1 mo.

$$\underline{\$47200}$$

A's share = $\frac{19200}{47200}$ of \$1180 = \$480

B's share = $\frac{28000}{47200}$ of \$1180 = 700

$$\underline{\$1180}$$

- (13.) Haven paid Smith \$900, one month before it was due, and the balance when due; so he is entitled to a credit on \$900 for 1 month, or to a credit on \$1 for 900 months.

Smith paid Haven \$500, 7 months before it was due, so that Smith is entitled to a credit of \$500 for 7 months, or to a credit of \$1 for 3500 months.

Hence, Smith is entitled to a credit on the balance, \$350, from the day it is due, equal to a credit of \$1 for 3500 + 900 = 2600 months, which for \$350 = $\frac{2600}{350}$ months = 7 months, 13 days Ans.

(ART. 353-400, p. 356.)

- (1.) \$6500 + \$13000 = \$19500

A's part = $\frac{6500}{19500} = \frac{1}{3}$

B's part = $\frac{13000}{19500} = \frac{2}{3}$

B's part being 2 times A's, his tax is $\$81.25 \times 2$
 = \$162.50 Ans.

- (2.) At 100 it pays 8 %; to pay 6 %, it must be bought at $\frac{8}{3}$ of 100, or at $133\frac{1}{3}$ Ans.

- (3.) \$5000 \times .05 = \$250.

\$250 \times 1.14 = \$285 Ans.

- (4.) \$1 \times $1.00\frac{1}{4}$ = \$1.00 $\frac{1}{4}$, cost of \$1.

\$1.00 $\frac{1}{4}$ \times 9860 = \$9884.65 Ans.

- (5.) $\$1 - \$.01\frac{1}{2} = \$.985$
 $\$1 \times .0055 = .0055$
 $\underline{\$.9795}$
 $\$10000 \div \$.9795 = 10209.18 + \text{Ans.}$
- (6.) $\$1000 \times .03 = \30 , interest.
 $\$30 \times .15 = \4.50 , premium.
- (7.) $90 : 118 :: 7\frac{1}{2} \% : 9\frac{5}{8} \%$.
- (8.) 5's at 100 pay \$5 ; hence, to pay \$4, the price of the 5' must have been at $\frac{4}{5}$ of 100, or 80. **Ans. \$80.**
- (9.) $7\frac{5}{10} = 7.5$.
 $\sqrt{7.5} = 2.738 + \text{Ans.}$
- (10.) $25^2 = 25 \times 25 = 625$.
 $\sqrt{25} = \underline{5}$
620 Ans.
- (11.) $\$4.86 = \pounds 1$.
 $\$1946 \div \$4.86 = 400.545$
 $\pounds 400.545 = \pounds 400 \text{ } 10 \text{ s. } 10\frac{1}{2} \text{ d. } \text{Ans.}$
- (12.) $\begin{array}{r} 32768 \overline{) 32} \text{ Ans.} \\ 27 \\ \hline 5768 \\ 27 \\ \hline 5768 \end{array}$
 $\begin{array}{r} 30^2 \times 3 = 2700 \\ 30 \times 2 \times 3 = 180 \\ 2^2 = \underline{4} \\ 2884 \times 2 = \underline{5768} \end{array}$
 $\begin{array}{r} 42\frac{1}{8} = 42.875 \overline{) 3.5} \text{ Ans.} \\ 27 \\ \hline 15875 \\ 27 \\ \hline 15875 \end{array}$
 $\begin{array}{r} 30^2 \times 3 = 2700 \\ 30 \times 5 \times 3 = 450 \\ 5^2 = \underline{25} \\ 3175 \times 5 = \underline{15875} \end{array}$

(13.)

| | | | |
|---------------------|---|---|--|
| 40 7 <hr/> 47 | $\begin{array}{r} 729 \overline{) 27} \\ 4 \\ \hline 329 \\ 329 \\ \hline \end{array}$ | $10^2 \times 3 = 300$ $10 \times 3 \times 3 = 90$ $3^2 = 9$ $399 \times 3 =$ | $\begin{array}{r} 2197 \overline{) 13} \\ 1000 \\ \hline 1197 \\ \hline \end{array}$ |
|---------------------|---|---|--|

$47 \times 7 =$

$399 \times 3 =$

Since the square root of $729 = 27$, and the cube root of $2197 = 13$, the product will be $27 \times 13 = 351$ Ans.

(ART. 401-457, p. 357.)

(1.) $\frac{1}{2} \times 320 \times 16\frac{1}{2} \times 12 = 30$ in.
 12 yds. 1 ft. 6 in. $= 450$ in.
 $\frac{30}{450} = \frac{1}{15}$ Ans.

(2.) $15.432 \times 1000 = 15432$.
 $15432 \div 7000 = 2.2045\bar{7}$ Ans.

(3.) $38 \times 27 = 1026$ sq. ft.
 $(8 \times 8) \times 2 = 128$ sq. ft.
 $\frac{1026}{128} = 8$ sq. ft.
 $898 \div 9 = 99\frac{8}{9}$ sq. yd.
 $\$45 \times 99\frac{8}{9} = \44.90 Ans.

(5.) $50^2 = 50 \times 50 = 2500$
 $60^2 = 60 \times 60 = 3600$
 $\frac{3600}{2500} = 1.44$
 $\sqrt{6100} = 78.1$
 78.1 miles Ans.

(6.) $\frac{2}{3}$ of $\$1.40 = \$.60$
 $\$.60 \div \frac{2}{3} = \$.90$
 $27 \div .90 = 30$ bu. Ans.

(7.) 13 A. 96 sq. rd. $= 2176$ sq. rd. $= 65824$ sq. yd.
Ans. 65824 hills.

(8.) $11^2 = 121$; $.7854 \times 121 = 95.0334$ cu. in.
 $9^2 = 81$; $.7854 \times 81 = 63.6174$ cu. in.
 $95.0334 \times 63.6174 = 6045.77782116$
 $\sqrt{6045.77782116} = 77.7546$ cu. in.
 236.4054 cu. in.
 17
 16548378
 2364054
 $\frac{1}{3}$ of $8\frac{1}{2} = 1\frac{1}{6}$
 1 gal. = 231 cu. in. $6)4018.8918$ cu. in.
 1 qt. = $2\frac{3}{4} = 57.75$ cu. in. 669.8153 cu. in.
 $669.8153 \div 57.75 = 11.5 +$
 Ans. $11.5 +$ quarts.

(9.) $7 : 12 :: \$300 : \$514\frac{2}{3}$ Ans.

(10.) $2 \times 3 \times \frac{1}{2} = 3.$ $\$250 \times 3 = \750 Ans.

(11.) $\frac{12\frac{1}{2} (\frac{1}{2} \times \frac{1}{2})}{\frac{3}{2} \div \frac{1}{2}} = \frac{\frac{3}{2} \times \frac{1}{2} \times \frac{1}{2}}{\frac{3}{2} \times \frac{1}{2}} = \frac{27455}{136}$
 $= \frac{5491}{136} = \frac{5491 \times 57}{252 \times 142} = \frac{312987}{35784} = 8.7409 +$ Ans.

(12.) $50 \left\{ \begin{array}{l} 40 \text{ c., to gain 1 c. take } \frac{1}{10} \text{ lb.} \\ 48 \text{ c., " " 1 c. " } \frac{1}{8} \text{ lb.} \\ 55 \text{ c., to lose 1 c. " } \frac{1}{8} \text{ lb.} \\ 60 \text{ c., " " 1 c. " } \frac{1}{10} \text{ lb.} \end{array} \right\} \times 2000 = \left\{ \begin{array}{l} 22\frac{2}{3} \text{ lb.} \\ 111\frac{1}{3} \text{ lb.} \\ 44\frac{2}{3} \text{ lb.} \\ 22\frac{2}{3} \text{ lb.} \end{array} \right.$
 $200 \text{ lb.} \div \frac{1}{10} \text{ lb.} = 2000.$
 200 lb.

(13.) $1.469^2 = 2.157961$; $2.157961 \times .001 = .002157961$.
 $.02584).002157961(.083512422 +$

$$\begin{array}{r}
 20672 \\
 \hline
 9076 \\
 7752 \\
 \hline
 13241 \\
 12920 \\
 \hline
 3210 \\
 2584 \\
 \hline
 6260 \\
 5168 \\
 \hline
 10920 \\
 10336 \\
 \hline
 5840 \\
 5168 \\
 \hline
 6720 \\
 5168 \\
 \hline
 552
 \end{array}$$

$\sqrt[3]{.083512422} = .436 + \text{Ans.}$

(14.) $37\frac{1}{2} \times 28 \times 18 = 18900$ cubic decimeters.
 A cubic decimeter = 1 liter; hence, 18900 liters **Ans.**

(15.) $3\frac{1}{3}, 2\frac{1}{2}, \frac{5}{8} = - \frac{20}{8}, \frac{10}{8}, \frac{5}{8}$,
 Greatest common divisor of the numerators = $\frac{5}{8}$ **Ans.**
 “ “ “ of the denominators = $\frac{5}{6}$

(16.) $\$10.00 \div \$1.59\frac{1}{2} = \$6.26$; hence, I should receive 6 gold dollars and 26 cents in fractional currency.

(17.) $1\frac{1}{2}$ acres = 9408960 square inches.
 $9408960 \times 6 = 56453760$ cubic inches, or what would
 be removed in cubic inches.
 $56453760 \div 1728 = 32670$ cubic feet.
 $32670 \div 27 = 1210$ cubic yards **Ans.**

$$(18.) \quad 9 \left\{ \begin{array}{l} 6 \text{ c., to gain 1 c. take } \frac{1}{3} \text{ lb.} \\ 8 \text{ c., " " 1 c. take 1 lb.} \\ 10 \text{ c., to lose 1 c. take 1 lb.} \\ 12 \text{ c., " " 1 c. take } \frac{1}{3} \text{ lb.} \end{array} \right\} \times 75 \left\{ \begin{array}{l} 25 \text{ lb.} \\ 75 \text{ lb.} \\ 75 \text{ lb.} \\ 25 \text{ lb.} \end{array} \right.$$

$$200 \text{ lb.} \div \frac{8}{3} = 75.$$

Ans. 25 lb. at 6 c.; 75 lb. at 8 c.; 75 lb. at 10 c.; 25 lb. at 12 c.

$$(19.) \quad \begin{aligned} &\$.45 \times 96 = \$43.20, \text{ the cost.} \\ &\$43.20 \times 1.15 = \$49.68, \text{ price of the whole sold to clear} \\ &\quad 15 \%. \\ &96 \text{ gal.} \times .95 = 91.20 \text{ gals. left after waste.} \\ &91.20 \text{ gal.} \times .95 = 86.64 \text{ gals., after allowing for bad} \\ &\quad \text{debts.} \\ &\$49.68 \div 86.64 = \$.57 +, \text{ Ans.} \end{aligned}$$

$$(20.) \quad \frac{1}{2} \times 59 = \frac{59}{2} = 29\frac{1}{2}; 29\frac{1}{2} + \frac{1}{4} = 29\frac{3}{4}, \text{ Ans.}$$

$$(21.) \quad \begin{aligned} &\text{May 16} + 60 \text{ days} = \text{July } 15\frac{1}{18}, \text{ time when due.} \\ &\text{June 15 to July 18} = 33 \text{ days, term of discount.} \\ &\text{Interest of } \$2600 \text{ for 33 days at } 7 \% = \$16.682 \\ &\$2600 - 16.682 = \$2583.318, \text{ proceeds.} \\ &\text{Ans. Due July } 15\frac{1}{18}; \text{ proceeds, } \$2583.318. \end{aligned}$$

$$(22.) \quad \begin{aligned} &\text{Let } 100 \% = \text{C's part.} \\ &\quad 115 \% = \text{A's " } \\ &\quad 88 \% = \text{B's " } \\ &\quad \hline &\quad 303 \% \\ &\text{A's share} = \frac{115}{303} \text{ of } \$2500 = \$948\frac{44}{303} \\ &\text{B's " } = \frac{88}{303} \text{ " " } = \$726\frac{26}{303} \\ &\text{C's " } = \frac{100}{303} \text{ " " } = \$825\frac{20}{303} \\ &\quad \hline &\quad \$2500. \end{aligned}$$

$$(23.) \quad \begin{aligned} &16\frac{2}{3} \% = \frac{1}{6} = \text{loss. } \frac{8}{6} - \frac{1}{6} = \frac{7}{6}; \frac{7}{6} \text{ of the cost} = \$30; \\ &\text{Hence, loss on the first cow} = \$6. \\ &16 \% = \frac{4}{25} \text{ of the cost} = \$6; \text{ hence, } \frac{3}{5}, \text{ or cost} = \$37.50. \\ &\$37.50 + \$6 = \$43.50, \text{ what was got for the last cow.} \end{aligned}$$

- (24.) A can do the work in 12 days, and $\frac{1}{12}$ of it in 1 day.
 B " " 20 " " $\frac{1}{20}$ of it in 1 day.
 C " " 15 " " $\frac{1}{15}$ of it in 1 day.
 D " " 9 " " $\frac{1}{9}$ of it in 1 day.
 A, B, C, and D, working together, can do $\frac{1}{12} + \frac{1}{20} + \frac{1}{15} + \frac{1}{9}$
 of it = $\frac{6}{180} = \frac{1}{30}$ of it in 1 day, and the whole
 of it in $1 \div \frac{1}{30} = 30$ days.

- (25.) One step of A equals $1\frac{1}{2}$ steps of B;
 Then A's rate = $1\frac{1}{2} \times 6 = 7\frac{1}{2}$,
 and B's rate = $1 \times 7 = 7$.
 Hence, A is the faster walker.

- (26.) $24 + 1224 = 1248$; $1248 \times 52 = 64896$;
 $64896 \div 2 = 32448$ Ans.

- (27.) Due May 25 .0 days $\times 650 =$ 0 days
 " June 12 18 " $\times 1750 = 31500$ "
 " July 5 41 " $\times 1300 = 53300$ "
 $3700 \quad) 84800$ days
 $22\frac{3}{4}$ days.

May 25 + 23 days = June 17, the average date.
 June 17 + 60 days = Aug. 16, the equated time Ans.

- (28.) $90 : 112 :: 7\frac{1}{2} \% : 9\frac{1}{3} \%$ Ans.

(29.)

$100^2 = 10000$; $10000 \times .7854 = 7854$ sq ft., area of the circle.
 $\sqrt{7854} = 88.69$ ft. side of the equivalent square Ans.

- (30.) 9 A. $56\frac{1}{3}$ sq. rd. = $1496\frac{1}{3}$ sq. yd.
 The lot is $\frac{1}{3}$ as broad as long; hence, $\frac{1}{3}$ of its area will
 form a square whose side is the breadth of the lot,
 and 3 times this side is the length of the lot,
 $\frac{1}{3}$ of $1496\frac{1}{3} = 498\frac{1}{3}$; $\sqrt{498\frac{1}{3}} = 22\frac{1}{3}$ rods, the breadth,
 and $22\frac{1}{3} \text{ rods} \times 3 = 67$ rods, the length.
 $(22\frac{1}{3})^2 + 67^2 = 498\frac{1}{3} + 4489 = 4987\frac{1}{3}$.
 $\sqrt{4987\frac{1}{3}} = 70.553 + \text{rds.}$, distance of one corner from
 its opposite corner in rods.
 1 rod = $5\frac{1}{2}$ times .9144 meters = 5.0292 meters.
 $5.0292 \text{ meters} \times 70.553 = 354.825 + \text{meters, Ans.}$
- (31.) $160 \times 15 = 2400$; $2400 \div 33\frac{1}{3} = 72$ rds. Ans.
- (32.) $9 \times 6 = 54$; $54 \times 1\frac{1}{2} = 45$ board feet, Ans.
- (33.) 27 years $6\frac{1}{2}$ months = $27.54\frac{1}{6}$ years.
 $\$896 \times .06\frac{2}{3} = \$59.73\frac{1}{3}$, interest for 1 year.
 $\$59.73\frac{1}{3} \times 27.54\frac{1}{6} = \1645.155 , interest for given time,
 [Ans.]
- (34.) $\$8000 \times .06 = \480 in gold; $\$480 \times 1.12\frac{1}{2} = 540$,
 in currency, Ans.
- (35.) £1 = $\$4.8665$; $\$4.8665 \times 750 = \3649.875 in gold.
 $\$3649.875 \times 1.12\frac{1}{2} = \$4106.109 +$ in currency, Ans.
- (36.) A's \$500 for 9 mo. = \$4500 for 1 mo.
 B's \$700 " 12 mo. = \$8400 " "
 C's \$400 " 15 mo. = \$6000 " "
 Entire stock same as \$18900 for 1 mo.
 Hence,
 A's share = $\frac{4500}{18900} = \frac{5}{21}$ of \$600 = \$142 $\frac{2}{3}$
 B's " = $\frac{8400}{18900} = \frac{4}{3}$ of \$600 = \$266 $\frac{2}{3}$
 C's " = $\frac{6000}{18900} = \frac{20}{63}$ of \$600 = \$190 $\frac{1}{3}$ } Ans.
 Entire loss = \$600.

- (37.) $2\frac{1}{8}\% + \frac{1}{4}\% = 2\frac{3}{8}\% = .02375;$
 $1 - .02375 = .97625;$
 $\$5000 \div .97625 = \$5121.638 + \text{Ans.}$
- (38.) $10\frac{2}{5} = 10.5625. \quad \sqrt{10.5625} = 3.25 \text{ Ans.}$
- (39.) $\frac{3}{4} = 1.125. \quad \sqrt{1.125} = 1.04 + \text{Ans.}$
- (40.) \$36, first extreme ; \$60, last extreme ;
 12, number of terms ;
 Hence,

$$\frac{(36 + 60) \times 12}{2} = \$576 \text{ Ans.}$$
- (41.) 8 ft. 6 in. = 102 inches.
 $102 \times 102 = 10404 \text{ sq. in. area of the first square.}$
 $10404 \times 25 = 260100 \text{ sq. in. area of the last square.}$
 $\sqrt{260100} = 510 \text{ inches, or 42 ft. 6 in. Ans.}$
- (42.) 10 acres = $160 \times 10 = 1600 \text{ sq. rd. area of square.}$
 $\sqrt{1600} = 40 \text{ rods, length of one side.}$
 $40 \text{ rods} \times 4 = 160 \text{ rods, inclosure of the square.}$
 $\sqrt{1600 \div .7854} = \sqrt{2037.18} = 45.1 + \text{rods, diameter}$
 of circle.
 $45.1 \times 3.1416 = 141.68 +, \text{ circumference of the circle.}$
 $160 \text{ rods} - 141.68 \text{ rods} = 18.32 + \text{rods Ans.}$
- (43.) $4^3 : 12^3 :: 1 : 27, \text{ or } \frac{1728 \times 1}{64} = 27 \text{ Ans.}$

APPENDIX.

ANSWERS TO EXERCISES

IN THE

NEW ELEMENTARY ARITHMETIC.

NOTATION.

| Pp. | Ex. | | Pp. | Ex. | |
|-----|-----|---------|-----|-----|---------------------|
| 17. | 3. | 2,030 | 20. | 15. | 15,115 |
| | 4. | 83,333 | | 16. | 79,907 |
| | 5. | 906,666 | | 17. | 67,306 |
| | 6. | 316,000 | | 18. | 635,438 |
| | 7. | 21,021 | | 19. | 42,444 |
| | 8. | 250,500 | | 20. | 98,609 |
| | 9. | 999 | | 21. | 19,351 |
| | 10. | 999,999 | | 22. | 100,047 |
| 20. | 2. | 770 | | 23. | 1,010,010 |
| | 3. | 1,885 | | 24. | 61,016,605 |
| | 4. | 3,553 | | 25. | 812,347 |
| | 5. | 11,001 | 21. | 26. | 12,020,301 |
| | 6. | 1,111 | | 27. | 7,923,406 |
| | 7. | 73,592 | | 28. | 3,111,220,002 |
| | 8. | 84,909 | | 29. | 581,036,029 |
| | 9. | 230,506 | | 30. | 1,000,001,001,091 |
| | 10. | 41,019 | | 31. | 29,050,150 |
| | 11. | 9,907 | | 32. | 100,100,101 |
| | 12. | 89,097 | | 33. | 631,124,066 |
| | 13. | 21,121 | | 34. | 5,000,000,005,005 |
| | 14. | 300,006 | | 35. | 290,630,402,479,815 |

ADDITION.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|-----|-----|------|-----|-----|-------|-----|-----|-------|
| 29. | 8. | 1109 | 29. | 20. | 891 | 30. | 37. | 21248 |
| | 9. | 1531 | | 21. | 1048 | | 39. | 1799 |
| | 10. | 1504 | | 22. | 2097 | 31. | 44. | 8050 |
| | 11. | 1081 | 30. | 23. | 9945 | | 47. | 8312 |
| | 12. | 1683 | | 24. | 1851 | | 48. | 1843 |
| | 13. | 1952 | | 25. | 1294 | | 49. | 2311 |
| | 14. | 1863 | | 26. | 21464 | | 50. | 22765 |
| | 15. | 1833 | | 27. | 8276 | 32. | 52. | 300 |
| | 16. | 769 | | 28. | 7676 | | 54. | 1511 |
| | 17. | 919 | | 29. | 5851 | | 57. | 347 |
| | 18. | 215 | | 30. | 11866 | | 59. | 353 |
| | 19. | 712 | | 33. | 14163 | | | |

SUBTRACTION.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|-----|-----|-----|-----|-----|------|-----|-----|----------|
| 39. | 6. | 127 | 40. | 15. | 791 | 41. | 39. | 46 |
| | 7. | 507 | | 16. | 331 | | 43. | 2877 |
| | 8. | 710 | | 17. | 101 | | 48. | 938958 |
| | 9. | 707 | | 18. | 665 | 42. | 50. | 94934477 |
| | 10. | 113 | | 19. | 1008 | | 2. | 200 |
| | 11. | 189 | | 20. | 989 | | 4. | 81 |
| | 12. | 301 | | 21. | 3628 | 43. | 7. | 10 |
| | 13. | 11 | | 28. | 154 | | | |
| 40. | 14. | 89 | | 29. | 1608 | | | |

MULTIPLICATION.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|-----|-----|-------|-----|-----|--------|-----|-----|---------|
| 49. | 8. | 4949 | 49. | 16. | 14556 | 50. | 24. | 453915 |
| | 9. | 1005 | | 17. | 4121 | | 35. | 47100 |
| | 10. | 4836 | | 18. | 20390 | | 36. | 16686 |
| | 11. | 378 | | 19. | 17640 | 51. | 39. | 6892000 |
| | 12. | 5424 | | 20. | 54533 | 52. | 3. | 325 |
| | 13. | 11341 | 50. | 21. | 195657 | | 6. | 220 |
| | 14. | 12305 | | 22. | 233704 | 53. | 10. | 29415 |
| | 15. | 12032 | | 23. | 529518 | 52. | | 3190 |

APPENDIX.

DIVISION.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|-----|-----|---------------------|-----|-----|--------------------|-----|-----|--------------------|
| 62. | 10. | 116 $\frac{1}{2}$ | 66. | 9. | 958 | 67. | 31. | 960 |
| | 11. | 284 $\frac{1}{2}$ | | 10. | 314 $\frac{1}{2}$ | | 42. | 176 $\frac{5}{16}$ |
| | 12. | 1011 $\frac{1}{2}$ | | 15. | 100 | | 44. | 60 |
| | 13. | 946 $\frac{3}{4}$ | | 17. | 2854 $\frac{1}{2}$ | | 46. | 67 $\frac{3}{4}$ |
| | 14. | 11567 $\frac{1}{2}$ | | 18. | 2527 $\frac{1}{2}$ | 68. | 2. | 10817 |
| | 15. | 1760 | | 22. | 45 | | 3. | 206 |
| | 16. | 11296 $\frac{3}{4}$ | | 25. | 1422 $\frac{1}{2}$ | | 7. | 2078 |
| | 17. | 10120 | | 26. | 1309 $\frac{3}{8}$ | | | |
| 63. | 35. | 327 | | 29. | 185 | | | |

UNITED STATES MONEY.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|-----|-----|-----------|-----|-----|-----------|-----|-----|----------|
| 73. | 3. | \$261.795 | 73. | 11. | \$1317.18 | 76. | 4. | \$17.00 |
| | 4. | \$944.415 | 74. | 3. | \$101.29 | | 5. | \$164.40 |
| | 6. | \$1809.50 | | 4. | \$67.985 | 77. | 13 | \$7680 |
| | 8. | \$305.50 | 75. | 6. | \$760.96 | | | |
| | 10. | \$116.78 | | 11. | \$76.50 | | | |

FACTORING.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|-----|-----|--------|-----|-----|--------|-----|-----|--------|
| 82. | 3. | 3 × 19 | 83. | 11. | \$6972 | 88. | 10. | 24 |
| | 6. | 5 × 19 | 85. | 6. | 30 | 89. | 16. | \$48 |
| | 2 | 12675 | | 8. | 24 | | 20. | \$2.34 |
| 83. | 3. | 5535 | 88. | 4. | \$51 | | 22. | 378 |
| | 8. | \$6930 | | 9. | \$1.14 | | | |

COMMON FRACTIONS.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|---|------|-----|---------------------|------|-----|-----------------|
| 95. | 5. | $\frac{1}{2}$ | 100. | 11. | $1\frac{3}{4}$ | 109. | 19. | $\frac{1}{10}$ |
| | 6. | $\frac{7}{8}$ | | 12. | $2\frac{1}{10}$ | 110. | 5. | $\frac{3}{7}$ |
| | 10. | $\frac{9}{11}$ | 101. | 19. | $40\frac{7}{10}$ | | 6. | $1\frac{1}{10}$ |
| | 11. | $\frac{3}{4}$ | | 21. | $\$291\frac{9}{10}$ | | 9. | $\frac{2}{3}$ |
| 96. | 2. | $\frac{5}{8}$ | 102. | 6. | $2\frac{3}{4}$ | | 10. | $\frac{1}{3}$ |
| | 3. | $\frac{2}{5}$ | | 7. | $1\frac{3}{4}$ | | 13. | $\frac{1}{18}$ |
| | 4. | $\frac{2}{3}$ | | 11. | $1\frac{3}{4}$ | 111. | 16. | $\frac{1}{8}$ |
| | 5. | $\frac{2}{3}$ | | 12. | $2\frac{2}{10}$ | | 18. | $\frac{1}{3}$ |
| | 6. | $\frac{2}{3}$ | 103. | 20. | $9\frac{1}{10}$ | 112. | 6. | $16\frac{1}{2}$ |
| | 7. | $\frac{2}{3}$ | 104. | 5. | $10\frac{1}{2}$ | | 10. | 40 |
| 97. | 5. | $\frac{3}{4}$ | | 6. | $6\frac{1}{2}$ | | 15. | $14\frac{1}{2}$ |
| | 9. | $\frac{1}{2}$ | | 10. | 19 | | 17. | $20\frac{3}{8}$ |
| | 10. | $\frac{1}{2}$ | | 11. | 18 | 113. | 5. | $1\frac{1}{4}$ |
| | 11. | $\frac{1}{2}$ | 105. | 15. | $51\frac{3}{4}$ | | 6. | $1\frac{1}{3}$ |
| | 4. | $24\frac{1}{3}$ | | 17. | $225\frac{1}{11}$ | | 10. | $10\frac{1}{4}$ |
| | 5. | 45 | 106. | 5. | 15 | | 11. | $1\frac{1}{2}$ |
| | 8. | 1 | | 6. | $14\frac{1}{2}$ | | 13. | $\frac{1}{2}$ |
| | 9. | $30\frac{1}{8}$ | | 10. | $9\frac{1}{2}$ | | 15. | $8\frac{1}{2}$ |
| 99 | 7. | $\frac{1}{5}, \frac{2}{5}, \frac{1}{3}$ | | 11. | $22\frac{1}{2}$ | 114. | 11. | $\frac{1}{7}$ |
| | 8. | $\frac{1}{6}, \frac{2}{6}, \frac{1}{3}$ | 107. | 17. | $379\frac{1}{4}$ | | 17. | $\frac{1}{4}$ |
| | 9. | $\frac{1}{3}, \frac{1}{3}$ | | 19. | 1386 | | 21. | $4\frac{1}{2}$ |
| | 10. | $\frac{1}{8}, \frac{1}{8}, \frac{1}{8}$ | 108. | 5. | $\frac{1}{4}$ | 115. | 28. | 15 |
| 100. | 6. | $2\frac{3}{4}$ | | 9. | $\frac{3}{4}$ | | | |
| | 7. | $1\frac{3}{4}$ | | 11. | $\frac{3}{4}$ | | | |

DECIMAL FRACTIONS.

| Pp. | Ex. | | Pp. | Ex. | |
|------|-----|---------------|------|-----|-------------------|
| 122. | 4. | .005 | 123. | 3. | .161 and .010 |
| | 5. | .065 | | 5. | .5216 and .1600 |
| | 8. | .0014 | | 6. | .80000 and .09163 |
| | 9. | .1068 | | 7. | $\frac{1}{18}$ |
| | 12. | 103.21 | 124. | 4. | .725 |
| | 13. | 162.0121 | | 5. | .85 |
| | 19. | .0325 | 125. | 4. | 38.7535 |
| 123. | 2. | .060 and .103 | | | |

| Pp. | Ex. | | Pp. | Ex. | |
|------|-----|-----------|------|-----|-----------|
| 125. | 5. | 26.1941 | 128. | 18. | .00096 |
| | 6. | 1543.163 | 129. | 24. | 17.327 |
| 126. | 2. | 78.685 | 130. | 6. | .35 |
| | 6. | 5.625 | | 7. | .35 |
| | 7. | 18.875 | | 8. | 185 |
| | 12. | 63.879674 | | 11. | .131 |
| 128. | 7. | .0371 | | 12. | .00131 |
| | 8. | 132.606 | 131. | 19. | 3.65 |
| | 11. | 91.6 | | 24. | 8.2 |
| | 12. | 42.25 | 132. | 14. | 49.5625 |
| | 15. | .000081 | 133. | 6. | \$1702.20 |
| | 16. | 63 | | 9. | \$45 |

REDUCTION.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|---------|------|-----|-----------|------|-----|---------|
| 155. | 40. | \$11.76 | 156. | 46. | \$15 | 157. | 61. | \$8.60 |
| | 41. | \$400 | 157. | 56. | \$1410.15 | 158. | 62. | 645 lb. |

COMPOUND NUMBERS.

| Pp. | Ex. | |
|------|-----|-------------------------------------|
| 160. | 5. | 22 m. 1 fur. 20 rd. 2 yd. |
| | 7. | 162 A. 2 R. 23 P. |
| | 9. | 20 cu. yd. 24 cu. ft. 121 cu. in. |
| 161. | 12. | 20 hhd. 60 gal. 2 qt. 0 pt. 3 gills |
| | 14. | 94 bu. 2 pk. 6 qt. 0 pt. |
| | 16. | 20 d. 21 h. 49 m. 48 s. |
| | 18. | 9 S. 15° 50' 50''. |
| 164. | 5. | 2 lb. 0 oz. 15 pwt. |
| | 10. | 3 hhd. 22 gal. 2 qt. 1 pt. |
| | 12. | 37 bu. 0 pk. 3 qt. |
| | 13. | 16 ch. 29 bu. |
| | 15. | 1 y. 314 d. 22 h. 29 m. 59 s. |
| 166. | 22. | 10 mo. 13 d. |
| | 23. | 283 y. 8 mo. 22 d. |
| 167. | 3. | 107 T. 1 cwt. 0 qr. 10 lb. |

| Pp. | Ex. | |
|------|-----|-----------------------------------|
| 167. | 4. | 1 lb. 6 oz. 0 pwt. 20 gr. |
| | 5. | 74 lb. 0 oz. 13 pwt. 13 gr. |
| | 7. | 17 m. 6 fur. 20 rd. |
| | 12. | 50 bu. 2 pk. 4 qt. |
| | 13. | 705 wk. 1 d. 1 h. 58 m. |
| 168. | 16. | 57 h. 48 m. 30 s. |
| 169. | 3. | 1 cwt. 3 qr. 17 $\frac{3}{4}$ lb. |
| | 7. | 16 yd. 1 ft. |
| | 9. | 70 A. 2 R. 14 P. |
| 170. | 14. | 5 C. 32 cu. ft. |
| 171. | 1. | 1586 lb. |
| | 6. | 18 yd. 2 qr. 2 na. |

PERCENTAGE.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|-----------------|------|-----|--------------------|------|-----|--------------------|
| 174. | 3. | .09 | 177. | 3. | 5 % | 181. | 4. | 10 $\frac{3}{8}$ % |
| | 6. | .001 | | 4. | 6 % | 183. | 3. | \$10.47+ |
| | 9. | 1.15 | | 5. | 16 $\frac{3}{8}$ % | | 6. | \$24.38 |
| | 12. | $\frac{1}{2}$ | | 7. | 20 % | | 9. | \$84.01 |
| | 15. | $\frac{2}{15}$ | | 8. | 12 % | | 12. | \$126.00 |
| | 18. | 1 $\frac{1}{4}$ | | 9. | 7 $\frac{1}{16}$ % | 185. | 5. | \$27.09 |
| 176. | 4. | 6.72 | 178. | 2. | \$10.50 | 186. | 10. | \$64.925 |
| | 5. | 2.92 | | 3. | \$32.10 | | 14. | \$57.118 |
| | 8. | 23.10 | | 4. | \$22.25 | 187. | 3. | \$15.01 |
| | 9. | \$83.20 | 180. | 2. | 12 % | 189. | 3. | \$4.25 |
| | 10. | 128 | 181. | 3. | 20 % | | | |

GENERAL REVIEW.

| Pp. | Ex. | | Pp. | Ex. | |
|------|-----|---------------------|------|-----|--------------------|
| 189. | 2. | \$520, gain | 191. | 24. | .937+ |
| | 3. | 929 | | 26. | 1 T. 14 cwt. 2 qr. |
| | 6. | 135 ; 238 | | 28. | \$17600 |
| 190. | 7. | 56 | | 30. | 120 |
| | 11. | 10 | | 31. | $\frac{1}{4}$ |
| | 13. | 3, 5, 7, and 13 | | 32. | 25 % |
| | 20. | 3 mo. 16 d. | | 34. | 51 |
| 191. | 22. | \$20 $\frac{2}{18}$ | 192. | 37. | \$260 |

APPENDIX.

| Pp. | Ex. | | Pp. | Ex. | |
|------|-----|-------------------|------|-----|---------------|
| 192. | 45. | \$15 | 193. | 57. | \$21.90 |
| | 46. | 153 $\frac{1}{3}$ | | 59. | \$40.50 |
| | 47. | 852 $\frac{1}{2}$ | 194. | 62. | \$900 |
| | 48. | \$10 | | 63. | 13 |
| 193. | 49. | 81 $\frac{1}{2}$ | | 65. | \$45 and hat. |
| | 50. | \$48 | | 66. | 40 |

DICTATION EXERCISES.

NOTATION.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|-----|------|-----|-----|------|-----|--------|
| 201. | 1. | 83 | 201. | 5. | 990 | 201. | 9. | 774 |
| | 2. | 38 | | 6. | 110 | | 10. | 1041 |
| | 3. | 99 | | 7. | 101 | | 11. | 7727 |
| | 4. | 803 | | 8. | 417 | | 12. | 777100 |

ADDITION.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|------|------|-----|--------|------|-----|----------|
| 203. | 1. | 972 | 203. | 10. | 9202 | 203. | 19. | 112847 |
| | 2. | 1167 | | 11. | 7836 | | 20. | 87681 |
| | 3. | 1553 | | 12. | 7551 | | 21. | 22553 |
| | 4. | 2213 | | 13. | 5678 | | 22. | 44142 |
| | 5. | 1139 | | 14. | 10722 | | 23. | 89936 |
| | 6. | 2642 | | 15. | 74970 | | 24. | { 200528 |
| | 7. | 1638 | | 16. | 151426 | | | { 156631 |
| | 8. | 4425 | | 17. | 39931 | | | |
| | 9. | 6108 | | 18. | 80110 | | | |

SUBTRACTION.

| | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|-----|-----|-----|------|-----|-----|------|-----|-------|
| 1. | 1. | 284 | 204. | 14. | 295 | 204. | 27. | 692 |
| | 2. | 204 | | 15. | 283 | | 28. | 28 |
| | 3. | 271 | | 16. | 90 | | 29. | 801 |
| | 4. | 191 | | 17. | 181 | | 30. | 108 |
| | 5. | 303 | | 18. | 269 | | 31. | 1485 |
| | 6. | 289 | | 19. | 34 | | 32. | 792 |
| | 7. | 91 | | 20. | 122 | | 33. | 47989 |
| | 8. | 77 | | 21. | 522 | | 34. | 47492 |
| | 9. | 87 | | 22. | 98 | | 35. | 8133 |
| 10. | 103 | | | 23. | 801 | | 36. | 7636 |
| 11. | 386 | | | 24. | 377 | | 37. | 7996 |
| 12. | 402 | | | 25. | 769 | | | |
| 13. | 488 | | | 26. | 105 | | | |

MULTIPLICATION.

| | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|----|-----|--------|------|-----|---------|------|-----|---------|
| 6. | 1. | 21373 | 206. | 17. | 114513 | 206. | 33. | 4168434 |
| | 2. | 273 | | 18. | 7462 | | 34. | 63700 |
| | 3. | 12441 | | 19. | 84721 | | 35. | 4485349 |
| | 4. | 469 | | 20. | 10086 | | 36. | 58200 |
| | 5. | 39648 | | 21. | 33793 | | | 2233 |
| | 6. | 344 | | 22. | 4122 | | 37. | 6608 |
| | 7. | 35518 | | 23. | 38107 | | | 3996 |
| | 8. | 384 | | 24. | 3478 | | | 8789 |
| | 9. | 27084 | | 25. | 1704066 | | | 2613 |
| | 10. | 5211 | | 26. | 24492 | | 38. | 2064 |
| | 11. | 256076 | | 27. | 979994 | | | 35319 |
| | 12. | 549 | | 28. | 42588 | | | 8591 |
| | 13. | 36707 | | 29. | 1020329 | | 39. | 1320000 |
| | 14. | 2057 | | 30. | 32250 | | 40. | 95 |
| | 15. | 27084 | | 31. | 2848965 | | | |
| | 16. | 1207 | | 32. | 11550 | | | |

DIVISION.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. |
|------|-----|---------------------|------|-----|-----------------------|------|----------------------------|
| 208. | 1. | 632 | 208. | 12. | 9 | 208. | 23. 31 $\frac{441}{1000}$ |
| | 2. | 412 | | 13. | 86 $\frac{17}{100}$ | | 24. 39 $\frac{1233}{1000}$ |
| | 3. | 913 | | 14. | 250 $\frac{15}{100}$ | | 134 $\frac{2}{3}$ |
| | 4. | 721 | | 15. | 52 $\frac{4}{100}$ | | 432 $\frac{3}{4}$ |
| | 5. | 937 | | 16. | 81 | 25. | 3261 $\frac{3}{4}$ |
| | 6. | 552 | | 17. | 10 $\frac{40}{310}$ | | 128 $\frac{1}{2}$ |
| | 7. | 1775 | | 18. | 34 $\frac{118}{331}$ | | 241 $\frac{7}{13}$ |
| | 8. | 1222 | | 19. | 655 $\frac{10}{100}$ | 26. | 1147 $\frac{2}{10}$ |
| | 9. | 51 $\frac{13}{100}$ | | 20. | 1039 $\frac{48}{100}$ | | 401 $\frac{34}{100}$ |
| | 10. | 163 $\frac{1}{100}$ | | 21. | 186 $\frac{7}{100}$ | 27. | 102 $\frac{21}{100}$ |
| | 11. | 315 $\frac{20}{31}$ | | 22. | 7554 $\frac{27}{191}$ | | |

UNITED STATES MONEY.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. |
|------|-----|------------------------|------|-----|-----------------------|------|-------------|
| 209. | 1. | \$76.84 | 209. | 6. | \$1006.25 | 210. | 11. \$115 |
| | 2. | \$428.37 $\frac{1}{2}$ | | 7. | \$501 | | 12. \$2044 |
| | 3. | \$29699.50 | 210. | 8. | \$80.95 | | 13. \$3626 |
| | 4. | \$7.03 | | 9. | \$1570 | | 14. \$10.47 |
| | 5. | 31. | | 10. | \$62 $\frac{15}{110}$ | | 15. \$31.17 |

REDUCTION OF FRACTIONS.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. |
|------|-----|-----------------|------|-----|---------------------|------|--|
| 211. | 1. | $\frac{4}{8}$ | 211. | 8. | $\frac{4}{8}$ | 212. | 15. 1161 |
| | 2. | $\frac{3}{4}$ | | 9. | $\frac{2}{11}$ | | 16. 83 $\frac{1}{12}$ |
| | 3. | $\frac{33}{80}$ | | 10. | $\frac{51}{3}$ | | 17. $\frac{16}{40}, \frac{2}{5}$ |
| | 4. | $\frac{7}{9}$ | | 11. | $\frac{1020}{1350}$ | | 18. $\frac{6}{12}, \frac{2}{3}, \frac{2}{3}$ |
| | 5. | $\frac{9}{10}$ | | 12. | $\frac{568}{1000}$ | | 19. $\frac{28}{35}, \frac{4}{5}$ |
| | 6. | $\frac{6}{7}$ | 212. | 13. | $\frac{327}{20}$ | | 20. $\frac{2}{36}, \frac{1}{18}, \frac{1}{18}$ |
| | 7. | $\frac{18}{35}$ | | 14. | $\frac{710}{11}$ | | |

ADDITION OF FRACTIONS.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|----------------|------|-----|-----------------|------|-----|-----------------|
| 212. | 1. | $4\frac{1}{3}$ | 212. | 5. | $1\frac{1}{8}$ | 212. | 9. | $2\frac{7}{30}$ |
| | 2. | $1\frac{1}{8}$ | | 6. | $3\frac{7}{10}$ | | 10. | 14 |
| | 3. | $3\frac{1}{4}$ | | 7. | $10\frac{1}{8}$ | | 11. | $4\frac{1}{2}$ |
| | 4. | $1\frac{1}{8}$ | | 8. | $2\frac{5}{12}$ | | 12. | $15\frac{1}{2}$ |

SUBTRACTION OF FRACTIONS.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|----------------|------|-----|-----------------|------|-----|-----------------|
| 213. | 1. | $\frac{1}{6}$ | 213. | 5. | $\frac{1}{10}$ | 213. | 9. | $7\frac{1}{4}$ |
| | 2. | $\frac{1}{10}$ | | 6. | $1\frac{1}{10}$ | | 10. | $2\frac{1}{8}$ |
| | 3. | $\frac{1}{8}$ | | 7. | $\frac{9}{16}$ | | 11. | $13\frac{1}{6}$ |
| | 4. | $\frac{1}{16}$ | | 8. | $\frac{3}{4}$ | | 12. | $5\frac{1}{3}$ |

MULTIPLICATION OF FRACTIONS.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|-----------------|------|-----|----------------|------|-----|------------------|
| 215. | 1. | 10 | 215. | 6. | 35 | 215. | 11. | \$4,000 |
| | 2. | $5\frac{2}{3}$ | | 7. | $\frac{1}{2}$ | | 12. | $\frac{1}{2}$ |
| | 3. | 36 | | 8. | $\frac{1}{16}$ | | 13. | 5.128 |
| | 4. | 12 | | 9. | $6\frac{2}{3}$ | | 14. | $19\frac{1}{2}$ |
| | 5. | $11\frac{1}{3}$ | | 10. | \$49 | | 15. | $433\frac{1}{8}$ |

DIVISION OF FRACTIONS.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|----------------|------|-----|-----------------|------|-----|----------------|
| 216. | 1. | $\frac{4}{29}$ | 216. | 5. | $25\frac{1}{2}$ | 216. | 9. | $2\frac{3}{4}$ |
| | 2. | $\frac{1}{16}$ | | 6. | $7\frac{1}{2}$ | | 10. | $3\frac{1}{2}$ |
| | 3. | $\frac{3}{14}$ | | 7. | $1\frac{5}{16}$ | | 11. | 4 tons |
| | 4. | 16 | | 8. | $1\frac{7}{8}$ | | 12. | 14 |

DECIMALS.

ART. 258.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|--|------|-----|---------------|------|-----|-----------------|
| 217. | 1. | $\left\{ \begin{array}{l} \frac{1}{100} \\ .70; .05 \end{array} \right.$ | 217. | 2. | $\frac{5}{8}$ | 217. | 4. | $1\frac{3}{8}$ |
| | | 17 | | 3. | .625 | | 5. | $29\frac{1}{2}$ |

ART. 259.

| Pp. | Ex. | Pp. | Ex. | Pp. | Ex. | | | |
|-----|-----|---------|------|-----|--------|------|-----|------|
| 217 | 1 | 3.764 | 217. | 6. | 1.408 | 217. | 11. | 2100 |
| | 2. | 112.56 | | 7. | .27 | | 12. | 8200 |
| | 3. | 54.505 | | 8. | 34.56 | | 13. | .9 |
| | 4. | 8.0047 | | 9. | .0004 | | 14. | 1000 |
| | 5. | 18.9999 | | 10. | 22.763 | | 15. | 1.44 |

COMPOUND NUMBERS.

| Pp. | Ex. |
|------|---------------------------------------|
| 218. | 1. 26710 lb. |
| | 2. 5120 gr. |
| | 3. $147\frac{1}{2}$ ft. |
| | 4. 250470 sq. ft. |
| | 5. 426 cu. ft. |
| | 6. 1078 ft. |
| | 7. 633 qts. |
| | 8. 24726 h. |
| | 9. 325830" |
| | 10. 15 bu. 2 pk. 5 qt. |
| | 11. 84 mi. 120 rd. 3 yd. 2 ft. |
| | 12. 5 A. 147 sq. rd. |
| | 13. 13 rd. 9 ft. 6 in. |
| | 14. 64 sq. rd. |
| | 15. $2705\frac{3}{4}$ cu. yd. |
| | 16. 15 h. 47 min. 40 sec. |
| | 17. 3 hhd. |
| | 18. $9^{\circ} 3' 30''$ |
| | 19. 7 lb. 6 oz. 4 pwt. |
| | 20. 18 mi. 281 rd. $3\frac{1}{2}$ yd. |
| | 21. 3 mi. 314 rd. 4 yd. 6 in. |
| | 22. 18 cwt. 97 lb. 15 oz. |
| | 23. { 101 bu. 1 pk. |
| | { 185 bu. 2 pk. 4 qt. |

| Pp. | Ex. | |
|------|-----|--|
| 218. | 24. | { 32 A. 132 sq. rd. $9\frac{1}{2}$ sq. yd. |
| | | { 56 A. 43 sq. rd. $29\frac{1}{2}$ sq. yd. |
| | 25. | { 4 bu. 2 pk. 5 qt. 1 pt. |
| | | { 4 A. 107 P. |
| | 26. | { 1 hhd. 27 gal. 2 qt. |
| | | { 6 cwt. 62 lbs. |

PERCENTAGE.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|----------------------|------|-----|--------------------|------|-----|-------------------|
| 220. | 1. | 5 bu. | 220. | 5. | $37\frac{1}{2}$ A. | 220. | 9. | 15 % |
| | 2. | $.15\frac{5}{8}$ mi. | | 6. | 510 tons | | 10. | 4 % |
| | 3. | 7 yd. | | 7. | 20 % | | 11. | $\frac{1}{2}$ % |
| | 4. | \$175 | | 8. | 4 % | | 12. | $12\frac{1}{2}$ % |

INTEREST.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|--------|------|-----|--------------------|------|-----|----------------------|
| 220. | 1. | \$36 | 220. | 4. | \$1.26 | 220. | 7. | \$2.27 $\frac{1}{2}$ |
| | 2. | \$6.25 | | 5. | \$6.50 | | 8. | \$5.66 + |
| | 3. | \$.50 | | 6. | \$31 $\frac{1}{2}$ | | 9. | \$46.25 |

TEST EXAMPLES.

ART. 1-66.

| Pp. | Ex. | | Pp. | Ex. | |
|------|-----|------------|------|-----|---------|
| 221. | 2. | 5,643,534 | 221. | 7. | 11,298 |
| | 3. | 34,034,762 | | 8. | 311 |
| | 4. | 106,699 | | 10. | \$3,650 |
| | 5. | \$46,725 | | | |

ART. 66-94.

| Pp. | Ex. | | Pp. | Ex. | |
|------|-----|------------------|------|-----|--------------------|
| 222. | 1. | \$79.075 | 222. | 7. | \$18 $\frac{8}{7}$ |
| | 2. | \$14307.38 | | 8. | 2, 3, 5, 37 |
| | 3. | \$124.13 | | 9. | 50 |
| | 4. | \$330.21 | | 10. | 5 |
| | 5. | \$6945.93 | | 11. | 24 days |
| | 6. | 72 cows; 5 sheep | | 12. | 5 |

APPENDIX.

ART. 95-150.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|-----------------|------|-----|-------------------|------|-----|-----------|
| 223. | 1. | 113.03 | 223. | 5. | 644 $\frac{4}{5}$ | 223. | 9. | .84; 1.02 |
| | 2. | 50.0305 | | 6. | 160 | | 10. | .848 |
| | 4. | 1 $\frac{3}{8}$ | | 8. | $\frac{9}{25}$ | | 11. | \$2.810 |

ART. 151-194.

| Pp. | Ex. | | Pp. | Ex. | |
|------|-----|---------|------|-----|-----------------------------|
| 223. | 1. | 113.03 | 224. | 5. | 255 A. 78 sq. rd. |
| | 2. | 50.0305 | | 6. | 189341580 |
| 224. | 4. | .8125 | | 7. | 11 m. 265 $\frac{1}{3}$ rd. |

ART. 195-220.

| Pp. | Ex. | | Pp. | Ex. | | Pp. | Ex. | |
|------|-----|------------------|------|-----|-----------------|------|-----|-----------------|
| 224. | 1. | 1.25 | 224. | 4. | .015 | 224. | 8. | \$57.56 |
| | 2. | 16 $\frac{2}{3}$ | | 6. | 7 | | 9. | \$3950 |
| | 3. | \$2880 | | 7. | 8 $\frac{1}{2}$ | | 10. | 6 $\frac{3}{4}$ |

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